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WILDLIFE REVIEW

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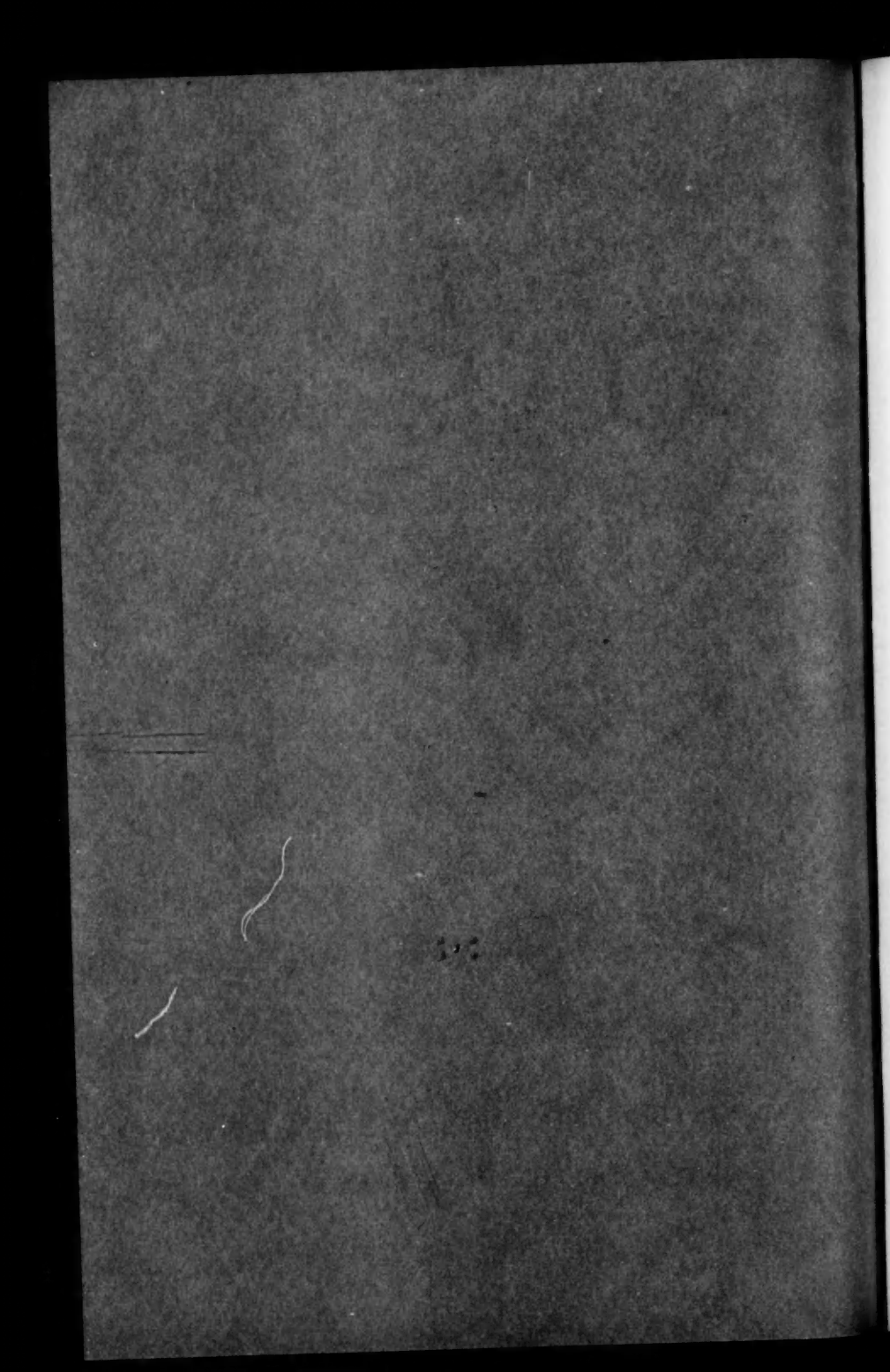

WILDLIFE REVIEW

An abstracting service for wildlife management
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Except as indicated, abstracts are by William H. Stickel, editor.

WILDLIFE--BIBLIOGRAPHY, BIOGRAPHY, HISTORY

Anonymous. PUBLICATIONS OF THE IOWA COOPERATIVE WILDLIFE AND FISHERIES RESEARCH UNITS. Dept. Zool. & Ent., Iowa St. Coll. ii + 42 p., mimeo. Jan. 1955.
Lists publications of many years. Titles are arranged by subject, each is fully cited, and there is a table of contents.

Stratton, G. Burder, ed. THE ZOOLOGICAL RECORD VOLUME THE EIGHTY-NINTH, BEING THE RECORDS OF ZOOLOGICAL LITERATURE RELATING CHIEFLY TO THE YEAR 1952. Zool. Soc. London. Mar. 1955. $19.20.
This is probably the most useful bibliographic series in zoology. Wildlife workers find a great deal of value in it, especially in the sections on birds and mammals. Each section is separately paged, cross-indexed, and may be purchased separately.

WILDLIFE--EDUCATION

Gordon, Eva L. (Cornell U.) SUMMER NATURE EXPLORATIONS. Cornell Rural School Leaflet 48(4): 1-32 p., illus. Spring 1955.
Hundreds of helpful suggestions for nature observations in your own yard, on a farm, at a wet place, at the seashore; for study of many sorts of animals and plants; for learning about the sky, weather, and rocks.

WILDLIFE--TECHNIQUES

Boe, Kenneth N. (US Forest Serv., Ogden, Utah.) A ONE-FOOT-SQUARE WIRE SEED TRAP. J. Forestry 53(5): 368-369, illus. May 1955.
Description, construction, cost, use.

Chase, Clarence D., and Stephen H. Spurr. PHOTO-INTERPRETATION AIDS. US Forest Serv., Lake States Forest Exp. Sta., (U. Minn., St. Paul 1, Minn.), Misc. Rep. no. 38. Pages? 1955? [From J. Forestry 53(6).]
This list of more than 100 aids to interpretation of aerial photographs is a revision of one published in 1948. It "is limited to relatively inexpensive items such as area measurement aids, linear and multiple use scales, and parallax devices. It also includes various types of stereoscopes. The list provides a brief description of each item and its use, and indicates where it may be obtained and the price, without implying recommendation."

Davison, Verne E., L. M. Dickerson, Karl Graetz, W. W. Neely, and Lloyd Roof. (Soil Cons. Serv., Auburn, Ala.) MEASURING THE YIELD AND AVAILABILITY OF GAME BIRD FOODS. J. Wildl. Mgt. 19(2): 302-308, illus. Apr. 1955.
Practical needs discussed, methods described, equipment illustrated, examples of use given. Table shows conversion of ground samples and seed-trap box contents to pounds per acre.--Verne E. Davison.

Gordon, Donald T. (US Forest Serv., Berkeley, Calif.) A PORTABLE "POLE LADDER." J. Forestry 53(6): 452-454, illus. June 1955.
Description and drawings of light ladder that makes it far simpler and safer to climb short distances up trees than it ever was with spurs or other devices. Furthermore, trees are damaged little if at all.

WILDLIFE--BIOMETRICS

D'Ancona, Umberto. THE STRUGGLE FOR EXISTENCE. E. J. Brill, Leiden. xi + 274 p., illus. 1954. Price not stated. Translated by Anne Charles and R. F. J. Withers. [From review by M. E. Solomon, J. An. Ecol. 24(1).]
"This book by the well-known Italian marine biologist is primarily a systematic account of the extensive body of biomathematical theory developed by the late Vito Volterra." Volterra's work is presented step by step in 122 pages. Other

WILDLIFE--BIOMETRICS--Continued

sections of the book give an elementary account of the ecological ideas involved in population dynamics, discuss in varying detail the work of other students of mathematical ecology, and consider Volterra's theories and formulas in the light of data from experiments and field studies. Solomon's long review gives a good idea of the nature of the book and shows why the book is inconclusive and unsatisfying in some important respects.

Evans, F. C., P. J. Clark, and R. H. Brand. (U. Mich.) ESTIMATION OF THE NUMBER OF SPECIES PRESENT ON A GIVEN AREA. Ecol. 36(2): 342-343. Apr. 1955.
A test of Gleason's method of estimating species numbers from plot samples was made on an area where actual species number was known from long and intensive study. Results were satisfactory.--L. F. Stickel.

WILDLIFE--ECONOMIC AND OTHER VALUES

Ritter, Charles. WHAT'S IT WORTH TO YOU? Wyo. Wildl. 19(5): 32-34, illus. May 1955.
Estimates of cash value of Wyoming's fish and game, based on outlay figures from other states coupled with license sales and other data for Wyo. Total annual value lies between $17 million and $70 million. "If we take a figure of $44 million, which is halfway between the minimum and maximum amounts, we can estimate that hunting and fishing in Wyoming last year was worth $147.00 to each state resident."

Sprecher, George E. (Wis. Cons. Dept.) USES AND FUTURE NEED OF WATER RESOURCES FOR RECREATION IN WISCONSIN. Presented at Water Resources Seminar, Natural Resources Committee of State Agencies, Madison, Wis. 15 + 6 p., mimeo. May 10, 1955.
Good paper on value and importance of wildlife, with special reference to need of including wildlife and other recreational features in planning for water use. Many figures are cited on value of wildlife. Includes 6-page bibliography by Walter E. Scott on water resources and their relation to wildlife.

White, David L. (N. H. Game Dept.) HOW NEW HAMPSHIRE ATTACHED THE DOLLAR SIGN TO ITS FISH AND WILDLIFE. N. H. Fish & Game Dept., Tech. Circ. no. 11. ii + 13 p. + 5 form sheets. Processed. 1955.
Explains for the technical man just how the economic survey of N. H. wildlife was made, gives data on reliability of the figures, and makes a number of suggestions for improving methods that were used. Workers planning economic wildlife surveys should study this paper.

White, David L. (N. H. Game Dept.) NEW HAMPSHIRE'S 22 MILLION DOLLAR SPORTSMEN. N. H. Fish & Game Dept., Tech. Circ. no. 11-a. 1-14 p., illus. 1955.
Popular presentation of results of survey of expenditures of sportsmen in N. H. in 1952. Expenses of residents and nonresidents are compared in respect to many types of goods and services. Kinds of game and fish preferred are also tabulated. Angling accounted for 60¢ out of each dollar and drew nearly half again as many sportsmen as hunting. Largest items were: (1) food and lodging, (2) transportation, and (3) arms and ammunition. "There are few industries...that put so many dollars into so many pockets in so many towns each year. Moreover, almost half of this is non-resident money, though there are twice as many residents harvesting the game and fish." Preferred game species were deer, grouse, rabbits, and pheasants.

WILDLIFE--NATURAL AREAS AND REFUGES

Carhart, Arthur H. ONE MAN CAN WIPE OUT OUR WILDLIFE REFUGES. Sports Afield 133(6): 21-25, illus. June 1955.
Discussion of proposals that have been made for transfer of various federal refuges to states, Bureau of Land Management, Army, or other organizations. The "one man" who can transfer them is the Secretary of the Interior. Refuges involved are, in the main, for nonmigratory game, but Klamath and Tule Lake refuges, which are highly important in the Pacific Flyway are threatened with conversion to homesteads. Author implies that pressure for transfer of certain other refuges stems from livestock interests.

Dundas, Lester H. (US F&WS, East Lake, Minn.) RICE LAKE NATIONAL REFUGE. Cons. Volunteer 18(104): 26-33, illus. Mar.-Apr. 1955.
Geology; history; goose management; harvests of hay, timber, and wild rice (by Indians); occurrence of other forms of wildlife.

Nice, Margaret Morse. (5725 Harper Ave., Chicago 37, Ill.) WICHITA MOUNTAINS WILDLIFE REFUGE IN PERIL. Nat. Mag. 48(6): 292-294, 331, illus. June-July 1955.
Describes the wildlife and scenery of Wichita Refuge and discusses plans of the Army to take over some of the finest parts of the refuge.

Steele, Ray C. (US F&WS, Winona, Minn.) UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE. Cons. Volunteer 18(105): 28-36, illus. May-June 1955.
Interesting general account of this refuge that extends 550 miles along the Mississippi and administers 266,772 acres. The southern part of the refuge, aside from sanctuaries, is handled by the states. Dams of the Army Engineers have created much fine waterfowl and fur animal habitat. Waterfowl hunting is on the basis of first come first served, but scattered areas amounting to about 1/5 of the refuge are closed to hunting. Some tracts are kept as wilderness areas. Upland game is hunted under state laws, but not before waterfowl season begins. Nearly 67,000 muskrats were trapped in 1953-54. Nearly 5,000 beavers have been caught to date and 15,000 minks have been trapped since 1940. Trappers take some $55,000 worth of fur annually. The refuge is also used for fishing, boating, swimming, picnicking, timber cutting, and naturalizing.

Various authors. THE SOUTHWEST'S NATIONAL FOREST WILDERNESS. Living Wilderness 19(51): 13-24, maps. Winter 1954-55.
Maps, describes, and gives useful information about the 14 wilderness areas of Ariz. and N. M.

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Sebrell, W. H., Jr., and Robert S. Harris, editors. THE VITAMINS / CHEMISTRY, PHYSIOLOGY, PATHOLOGY. Academic Press, N. Y. Vol. 1, xiii + 676 p. Vol. 2, xiii + 766 p. Vol. 3, xiii + 665 p. 1954. Vols. 1 and 2, $16.50. Vol. 3, $15.00. [From review by L. J. Harris, Nature, April 2, 1955.]
"...will immediately take its place as a standard reference work, and source book... Each chapter...contains a dozen or so sections, by separate authors, dealing successively and systematically with such matters as nomenclature, chemistry, industrial preparation, biochemical systems, specificity of action, biogenesis, assay, standardization, distribution in foodstuffs, effects of deficiency in animals, deficiency in human beings, pharmacology, pathology, requirements of animals, and human beings, and even 'future problems.' ...There is no doubt that this is far and away the most comprehensive treatment of the subject that has so far appeared in a single treatise."

WILDLIFE--BIOTAS, COMMUNITIES, GENERAL ECOLOGY

Cochran, Rod. (Ohio Div. Wildl.) OHIO'S WILDLIFE RESOURCES. Ohio Dept. Nat. Resources. 210 p., illus. 1955. $1.00 paper, $2.50 cloth.
A large (9 x 12) and attractive popular reference on Ohio's game and fish. Species are grouped by habitat in sections on farm lands, forest lands, wetlands, streams, and lakes. Species accounts include brief discussions of abundance, game status, natural history, and often a list of specific management recommendations. There are chapters on economic value of Ohio wildlife, wildlife management, and administration. In addition to the 47 color plates, numerous interesting photographs are used with the text. The appendix contains a complete annotated list of Ohio's fishes, birds, reptiles, amphibians, and mammals, as well as plans for nest boxes and other material.--L. F. Stickel.

Goin, Olive B. WORLD OUTSIDE MY DOOR. Macmillan, 60 5th Ave., N. Y. 11. 184 p., illus. 1955. $3.50. [From A.I.B.S. Bul. 5(2).]
"The author is the biologist wife of a biologist at the University of Florida. In her backyard on a hammock area at the outskirts of Gainesville, Mrs. Goin began to keep a journal about the creatures she observed. Gradually her casual observations became close observations and this charming book tells the story. Written in a style that will be enjoyed by everyone, the book should be particularly appealing to those living in similar southern regions with the same species. However, it should inspire possessors of 'backyards' everywhere to watch more carefully for the fascinating array of animals and birds that can inhabit one small piece of territory. Attractive cartoon-type drawings by Esther Coogle illustrate in a casual fashion."

Heaton, John R. THE ECOLOGY AND SUCCESSION OF A GROUP OF ACID AND ALKALINE STRIPMINE LAKES IN CENTRAL MISSOURI. M. A. thesis, U. Mo. 143 p., illus. 1951.
"This report upon...a group of stripmine lakes...presents data as to their physical-chemical conditions, depth, temperature, turbidity, pH, oxygen concentrations, dissolved minerals, nitrates and nitrites, as well as the biota as represented by the higher plants, plankton, benthos and fishes. By comparing the data obtained in 1949-50 with the conditions reported for the lakes in 1940-41 successional trends are evaluated."

Zim, Herbert S., and Lester Ingle. SEASHORES. Simon & Schuster, N. Y. Golden Nature Guide Series. 160 p., illus. 1955. $1.00 paper, $1.95 cloth.
Admirably illustrated guide to common animals and plants of U. S. seashores. Hundreds of kinds of animals and plants are shown in full color. Some drawings show anatomy or life history. The text gives brief but worthwhile information about the groups and how they live. Scientific names of species illustrated are stated in appendix. Although this book obviously is no substitute for specialized handbooks, it should serve as an attractive introduction, and it might suffice for those whose interest in the subject is casual.

WILDLIFE--NUMBERS AND NUMBER FLUCTUATIONS

Cole, LaMont C. (Cornell U.) THE POPULATION CONSEQUENCES OF LIFE HISTORY PHENOMENA. Quart. Rev. Biol. 29(2): 103-137, graphs. June 1954.
A theoretical and mathematical discussion of the relationships between life history patterns and population phenomena. "The birth rate, the death rate, and the age composition of the population, as well as its ability to grow, are consequences of the life-history features of the individual organisms. ...it is to be expected that natural selection will be influential in shaping life-history patterns to correspond to efficient populations." "One of the most striking points revealed by this study is the fact that the age at which reproduction begins is one of the most significant characteristics of a species, although it is a datum which is all too frequently not recorded in the literature of natural history." The author believes that study of adaptive values of variations in life-history features is one of the most neglected aspects of biology.--L. F. Stickel.

WILDLIFE--NUMBERS AND NUMBER FLUCTUATIONS--Continued

Kalela, Olavi. RANGE POSSESSION AS A FACTOR OF POPULATION ECOLOGY IN BIRDS AND MAMMALS (Über den revierbesitz bie vögeln und säugetieren als population-sökologischer faktor). Ann. Zool. Soc. 'Vanamo' 16(2). ii + 48 p. 1954. [Copies of translation made by Natl. Inst. Health for Dr. J. B. Calhoun have been deposited in John Crerar Library, Chicago, and US F&WS, Room 61, US Natl. Mus. Latter copy may be borrowed on interlibrary loan through US Dept. Int. Library, Wash. 25, D. C.]

Review paper with 5-page bibliography that includes many foreign-language titles. Author's major theses are: Stability and functional efficiency of a group, whose members utilize a common area, are facilitated by development of hierarchies. Superimposed upon hierarchial organization is the occupancy of home range by smaller sub-groups. Ranges tend to occur in clumps, even though the clumps are surrounded by uninhabited favorable habitat. This clumping has socially advantageous survival value. When the population density is low, ranges are located primarily in the more favorable habitats. As density increases range competition produces emigration into peripheral less favorable habitats. Here fluctuations in density are more marked. Mass emigration, and die-offs have a common origin and a common implication for survival of the population. Just preceding these events a large number of individuals are added to the population. When these approach maturity, competition for range occupancy develops. Reduction of the density by emigration or by death through shock disease results. Kalela views these two phenomena as a phase of biocoenotic equilibrium developed through evolutionary history.--J. B. Calhoun.

Siivonen, Lauri. THE GEOGRAPHICAL LOCATION OF FINLAND WITH REGARD TO GAME. Suomen Riista 8: 7-13, maps and graph. 1953.

In Finnish with English summary. Finland had little record cold in the 1920's and 1930's. Agricultural game, of southern origin, such as partridge and field hare, flourished. Willow ptarmigan, a northern animal, declined. Periods of record cold have been common since 1939; agricultural game has ebbed greatly and ptarmigan has been recovering. It is concluded that management should be concentrated on waterfowl, fur, and forest game animals that are adapted to Finnish climatic oscillations. 1949 was the worst game year in Finland in the last decade or so. The low of tetraonids in the 1940's was deepest in marginal regions; recovery has been best in the center of distribution in central Finland.

WILDLIFE--PARASITES AND DISEASES

Beaudette, F. R., ed. PSITTACOSIS / DIAGNOSIS, EPIDEMIOLOGY AND CONTROL. Rutgers U. Press. xvi + 240 p., illus. 1955. $5.00.

Report of symposium; includes papers by 18 experts. This book is no doubt the most comprehensive and authoritative work on its subject. Psittacosis and related viruses of a wide range of birds and mammals are discussed as to history, pathology, diagnosis, serology, epidemiology, and chemotherapy. The informative oral discussions of the experts are also recorded.

Lampio, Teppo. EPIDEMICS IN GAME. Suomen Riista 8: 64-69, illus. 1953.

In Finnish with English summary. "The writer discusses several of the most important problems in the epidemiology of game diseases and indicates the immense number of problems as yet unknown. The outbreak of epidemics at certain times of the year is examined in some detail. Different points concerning resistance and immunity in game as well as life cycles, virulence, etc., of parasites are raised in order to show the lack of the information at present and to emphasize the importance of the study of epidemics in the field."

Sprent, J. F. A. (U. Queensland Veterinary School, Brisbane.) ON THE INVASION OF THE CENTRAL NERVOUS SYSTEM BY NEMATODES. I. THE INCIDENCE AND PATHOLOGICAL SIGNIFICANCE OF NEMATODES IN THE CENTRAL NERVOUS SYSTEM. II. INVASION OF THE NERVOUS SYSTEM IN ASCARIASIS. Parasitology 45(1-2): 31-55, illus. + 2 plates. May 1955.

Review paper and report of experiments. The invasions can be serious.

WILDLIFE--MORTALITY FROM INSECTICIDES, WEATHER, CARS, ETC.

Boyce, A. P., and L. J. Verme. (Mich. Dept. Cons.) TOXICITY OF ARSENITE DEBARKERS TO DEER IN MICHIGAN. Presented at 16th Midwest Wildl. Conf., St. Louis, Mo., Dec. 1-3, 1954. 9 + 3 p., processed. 1954.

Porcupines, rabbits, and several deer were found dead after chemical debarking operations; autopsies revealed presence of lethal amounts of sodium arsenite. Evidence was found that animals were getting lethal dosages of arsenite from spillage or accumulation at bases of trees that had received excessive applications. As little as 4cc. of arsenite solution was lethal to a yearling deer. Tests indicated preference for red-dyed chemical and non-preference among different arsenite compounds and common salt. Unsuccessful tests were made on almost 50 possible deer repellents.--L. F. Stickel.

Dahlen, James Howard. ACUTE TOXICITY OF CERTAIN INSECTICIDES TO THE BOBWHITE QUAIL AND MOURNING DOVE. M. S. thesis, Ala. Polytechnic Inst. 72 p., illus. 1952?

See WR 78: 18.

Fielding, James R., and William P. Baldwin. (US F&WS.) EFFECT OF SOME NEW INSECTICIDES ON FISH AND WILDLIFE. N. C. St. Coll., Pesticide Handbook p. 84-99. 1955.

Summarizes results of laboratory and field studies on the effect of DDT and ten of the newer insecticides on fishes, birds, and mammals. In addition, information is presented on the theoretical hazards to fish from agricultural use of these materials at recommended dosages. Precautions are given for safe use of insecticides with respect to fish and wildlife.--P. F. Springer.

Springer, Paul F. (Patuxent Refuge, Laurel, Md.) PLANT PESTICIDES AND WILDLIFE. N. C. St. Coll., Pesticide Handbook p. 101-116. 1955.

A review of the effects of commonly used herbicides and fungicides on wildlife. Most materials present little or no toxic hazard to mammals and birds and some of them have the favorable property of repelling these animals. A few herbicides are very toxic to aquatic life and should be applied with care. Herbicides exert their greatest influence on wildlife in modifying habitat. They are now being used by wildlife managers to improve food and cover conditions. Some herbicide operations along roadsides and on agricultural and forest lands appear to be detrimental to wildlife habitat and point up the need for cooperative studies to determine modifications of existing procedures.--P. F. Springer.

Wildlife Management Institute. INSECTICIDE CAUSES HEAVY MORTALITY AMONG NEW BRUNSWICK'S SALMON. Outdoor News Bul. 9(9): 2. May 6, 1955.

DDT was sprayed over a forested drainage for budworm control in 1954. "Fingerlings were virtually absent two months later in both streams; small parr were reduced to one-sixth the 1953 level on the Northwest Miramichi and to one-half on the Dungarvon; and large parr were only two-thirds as abundant on the Northwest Miramichi as during the previous years, whereas they were cut to one-half on the Dungarvon... Although heavy mortality immediately followed the spraying, delayed action caused many deaths up to four months later. Most of the immature stages of all kinds of aquatic insects were killed... These insects are the main food items for young salmon and some of the more important species may not be plentiful again for many years." [See Kerswill, p. 42, this issue of WR.]

WILDLIFE--MANAGEMENT--GENERAL

Cahalane, Victor H. (N. Y. St. Mus., Albany.) SOME EFFECTS OF EXOTICS ON NATURE. Atlantic Nat. 10(4): 176-185, illus. Mar.-Apr. 1955.

Review of plant and animal introductions and their consequences in many parts of world. Scores of examples are cited. "It would be desirable to institute in each country an advisory board, composed of leading botanists, zoologists and ecologists, to examine the ascertainable facts and to recommend action on proposed introductions."

WILDLIFE--MANAGEMENT--GENERAL--Continued

Cowan, I. McT. (U. of B. C., Vancouver.) WILDLIFE CONSERVATION IN CANADA. J. Wildl. Mgt. 19(2): 161-176. Apr. 1955.
Presents a good over-all picture of importance and management of Canadian wildlife at midcentury. Major subjects discussed are: legal position of wildlife, training of wildlife officers, federal and provincial administration, work of private organizations, importance of wildlife in the economy, conservation and management of waterfowl, value (table) and management of fur animals, predator control, management of gallinaceous game birds, management of big game, utilization of marine mammals.

Dresser, Cleveland van. RAPE OF THE ARKANSAS BOTTOM LANDS. Sports Afield 133(4): 114-119, illus. Apr. 1955.
The Army Engineers plan to ditch and drain the Cache River bottomlands so that they can be converted into farmland. Wildlife resources worth millions a year will be lost, the Miss. Flyway will be dealt a serious blow, floodwaters will be dumped more rapidly into the already flood-prone White and Miss. rivers, and water tables will be lowered, thus crippling several waterfowl management areas that already have water problems. Rice, a heavily surplus commodity, is expected to be a main crop on the reclaimed land. The author believes that the economic value of wildlife now produced on the land is greater than the agricultural value would be. He points out that this project is just one of many that are rapidly destroying our swamp and bottomland areas.

Dresser, Cleveland van. DAM THE CLEARWATER? Sports Afield 133(5): 110, 112-115, illus. May 1955.
Dams 600 feet high are proposed for the Clearwater River of Idaho by the Army Engineers. They would produce power and simplify logging. They would also remove much valuable winter range of deer and elk. They would make salmon and steelhead runs impossible. The impoundments would fluctuate 200 feet between steep banks, making poor fishing and ruling out many recreational and residential developments. They would flood out much existing construction and would make the Lewis and Clark Highway longer and more costly.

Knott, Norman P., and Chester C. Ball. (Wash. Dept. Game.) AN EVALUATION OF HABITAT MANAGEMENT. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 270-275. May 1954. [1955.]
Washington's work in improving pheasant habitat aims at supplying whatever habitat element is lacking at a given site. The need may be water at one place, and a certain type of cover at another place. Kills nearly doubled in 2 counties in which improvements were made; at the same time, kills declined slightly in an adjacent county in which improvements had not been made. In another county in which work was done, kills increased 279% from 1947 to 1953 while statewide increase was only 50%. Work on the project to date cost approximately $200,000 and resulted in an estimated increase of 15,000 pheasants per year. On a 20-year basis, this would mean the expenditure of $200,000 caused addition of some 300,000 pheasants. Most improvements, aside from water developments in arid country, show little effect in first 3 years. The authors point out that evaluation of game development work must be based primarily on game production. Any other type of evaluation "must at least in part be in error." The authors also show that various land use changes have had marked effects on game populations, often good effects; it is clear that habitat change is a useful tool. If development work fails to have the desired effect it simply proves that we do not know enough and that more information and a new tack are needed.

Lampio, Teppo. GAME MANAGEMENT. Suomen Riista 8: 14-21, illus. 1953.
In Finnish with English summary. Emphasis in Finnish game management has been shifted to habitat improvement; principles of the new program are discussed. It is shown that natural mortality takes 4 to 5 times as many game animals as do hunters. The best way to correct this is to increase carrying capacity of the land. More interspersion of habitats is an outstanding need. Practical techniques are being developed for these purposes.

WILDLIFE--MANAGEMENT--GENERAL--Continued

Lampio, Teppo. REFUGES IN THE SERVICE OF GAME MANAGEMENT. Suomen Riista 8: 22-29, illus. 1953.

In Finnish with English summary. Surpluses of small game seldom spread beyond the refuges, so small-game refuges should be closed to hunting for only 1-3 years. Longer closure invites overpopulation and disease; diseases may spread to surrounding areas. Emphasis in refuges should be on habitat improvement. Refuges should be changed continuously. After 1-3 years of protection and improvement, a refuge should be opened to hunting and a new one established. Thus large parts of a hunting area can be treated over a period of years. In addition, most areas have economically unimportant places that can be devoted to habitat improvement for game.

Paavolainen, Eero-Pekka. NATURE PROTECTION AND HUNTING. Suomen Riista 8: 120-130, illus. 1953.

In Finnish with English summary. Finland probably cannot set up large national parks for nature preservation. But with general protection, animals have a chance to survive even near centers of civilization. Preservationists and hunters have their differences, especially on the predator question. Several birds of prey are nearly extinct in Finland. The same may be said of bear, lynx, wolf, and wolverine. The last wild reindeer were exterminated by the 1880's. "Despite these points, both game management and nature protection work mostly with the same interests and complement each other... Both the spread of knowledge of wildlife and game research serve the interests of nature protection. In the future, it is to be hoped, the two may largely be combined under the general title of nature conservation." See also the following article (in Suomen Riista) by Heikki Suomus, who points out that game conservationists do not intend to exterminate even the most harmful species, and that "A negative attitude toward hunting as a whole places extra difficulties in the path of a cooperative program intended to promote the common interests of preserving and enriching nature."

PROCEEDINGS OF THIRTY-FOURTH ANNUAL CONFERENCE OF WESTERN ASSOCIATION OF STATE GAME AND FISH COMMISSIONERS, Las Vegas, Nevada, May 3, 4, 5, 1954. xv + 351 p., mimeo. [1955.] $2.00 from Ben Glading, Calif. Dept. Fish & Game, 926 J St., Sacramento 14, Calif.

This paper-bound volume contains 71 consecutively paged papers on game and fish problems. Many of these papers are listed separately in this issue of WR. Topics to which groups of papers are devoted are: problems of wildlife on public lands, adequacy or inadequacy of present game harvests, public relations, training personnel, law enforcement, looking ahead in wildlife management, big-game range research, chukar partridge, and the problem of getting wildlife management practices put into effect on private lands.

Stanton, Frank W. (Ore. Game Comm.) OREGON'S HABITAT IMPROVEMENT PROGRAM. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 279-281. May 1954. [1955.]

Work has been limited in large part to demonstration areas and to practices that serve the farmer as well as wildlife. Ten-year agreements are signed with landowners, who must agree to protect the improved sites. At least half the plantings are checked each fall. Active farmer participation has seldom been obtained. Attempts to interest sportsmen's groups in sponsoring habitat improvement projects generally have failed. Department crews have to do the actual work. Cover of various types has been planted. Elevated quail roosts and guzzlers have been installed and both are successful. Much food planting is done on waterfowl management areas, but attempts to lease small units for waterfowl work had to be abandoned because of competition with duck hunters for the land and difficulty of securing leases. For big game, much work is done in reseeding burns and establishing waterholes on dry ranges.

Titus, Harold. THE WIDE MISSOURI GETS WIDER. Field & Stream 58(11): 45-47, 99-101, illus. Mar. 1954.

Tells of the great new impoundments being formed on the Upper Missouri, of the effects they will have on wildlife resources, and of what is being done to compensate in some degree for the wildlife losses that will result. Losses are expected to be far greater than gains. For example, much of the deer habitat in N. Dak. will be lost.

WILDLIFE--MANAGEMENT--HARVESTS AND HUNTING

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) DOES UPLAND GAME BEAR ITS FAIR SHARE OF HUNTING PRESSURE? Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 65-74. May 1954. [1955.]

The author discusses the problems of getting a suitable harvest of game animals while giving adequate protection to the stock. He considers the special factors involved in regulating waterfowl harvests and cites several species of waterfowl that might stand heavier kills, especially in Calif. He then cites numerous examples (with references) that show various upland game birds and deer could or even should receive heavier shooting under certain circumstances. But "let me urge that we do not lose sight of the fact that habitat management is even more essential to successful wildlife administration than control of the hunting take."

WILDLIFE--MANAGEMENT--FARM

Anderson, Wallace L., and Frank C. Edminster. THE MULTIFLORA ROSE FOR FENCES AND WILDLIFE. USDA Leaflet no. 374. 8 p., illus. 1954.

Davison, Verne Elbert. LESPEDEZAS FOR QUAIL AND GOOD LAND USE. USDA Leaflet no. 373. 8 p., illus. 1954.

Durell, James. (Ky. Dept. Wildl. Resources.) MANY FARMERS JOIN TO PROVIDE MORE GAME FOR THIS FALL. Ky. Happy Hunting Ground 11(3): 16-17, 25, illus. May 1955.

"...new facts and ideas about bicolor, japonica and multiflora" in Ky. Early and repeated cultivation is important; about 2/3 of plants will fail without it. Best fertilizer for multiflora is 4-12-12; it encourages dense rather than open growth. Shrub lespedeza plots all failed on lands that showed more than 170 lbs. phosphate per acre; hence, muriate of potash rather than 0-12-12 is recommended for Bluegrass region unless phosphate is low; where phosphate is low, probably 4-12-12 is best for shrub lespedezas. Good time to fertilize is just after first cultivation. Some well-cared-for plots of japonica lespedeza had good seed crops their first year, which bicolor has not done in Ky. Bicolor is used by quail chiefly in late winter, after hunting, and after favorite foods are gone. Two-row rose hedge is recommended, both for wildlife value and to avoid skips. Multiflora is not shade-tolerant. Bicolor grows well enough with sun half a day if it gets normal moisture. Shrub lespedezas seem to do best in sandy, acid soils that are suitable for sheep sorrel, sour dock, broomsedge, pine, and sweet gum. They do poorly in soils that are 42% or more clay and have pH of 5.8 or higher. Sweet clover grows well on soils least suited to shrub lespedezas.

Slocum, Walter L., and LaMar T. Empey. THE ROLE OF THE FARMER IN UPLAND GAME PRODUCTION AND HUNTING IN WHITMAN COUNTY. St. Coll. Wash., Wash. Agr. Exp. Sta., Bul. 552. iii + 24 p., map & graphs. July 1954.

Whitman Co. in e. Wash. was formerly prairie but is now intensively farmed. Game cover has been and is being eliminated on a large scale by clean farming. Pheasant, Hungarian partridge, and 2 kinds of quail (all introduced) are present. A random sample of 190 farmers was interviewed for their views on game and hunting. In general, they liked game birds and felt that they were decreasing, but they did not attribute the decrease to removal of cover. They planned to remove more cover and had various practical reasons for so doing. Most felt that shrubs and woodlots were unnecessary if not objectionable. It was clear that game ranked low in farmers' scales of value, and that farmers and biologists had quite different ideas as to why game birds were not commoner. Few farmers felt any responsibility for producing game. Most farmers permitted hunting although they had suffered damages from hunters; however, they wanted hunters to ask permission. They believed that about 80% of hunters were well behaved. Opening of county to deer hunting was unpopular and caused a material increase in posting against all hunting. Sentiment against the deer season was less after the first hunt was held.

WILDLIFE--MANAGEMENT--FARM--Continued

Zimmerman, F. R. (Wis. Cons. Dept.) MULTIFLORA ROSE: LIVING FENCE. Wis. Cons. Bul. 20(4): 3-6, illus. Apr. 1955.
This rose will make a dependable hedge in s. Wis. if planted on good land and started with proper care. Instructions for planting and care are given, and advantages and disadvantages of the plant are reviewed.

WILDLIFE--MANAGEMENT--FOREST AND RANGE

Christisen, Donald M. (Mo. Cons. Comm.) YIELD OF SEED BY OAKS IN THE MISSOURI OZARKS. J. Forestry 53(6): 439-441. June 1955.
Data were obtained from 148 trees of 5 species in 2 localities over a 6-year period. Figures are given on yields, percentages of mature acorns, and numbers of sound acorns. Some of the conclusions are: Yields are highly variable from year to year, but all oak species are not likely to fail in same year. Wildlife workers should, therefore, seek to have a variety of oak species on an area. Individual trees vary widely in yield, but large-crowned trees tend to yield best. Many acorns fail to mature and many others are damaged by irsects. Relatively few are sound and mature. Deer damaged pine plantations and juniper more when acorn crop was light. Wildlife preferences for acorns of certain species were not evident. Artificial seeding of oaks should be most successful in a good mast year; at other times seeds should be protected from rodents. Productive trees (or, lacking records, trees with large crowns) should be spared in lumbering; this is desirable both for oak reproduction and provision of wildlife food.

Davison, Verne E. (Soil Cons. Serv., Auburn, Ala.) HARDWOODS MEAN MUCH TO WILDLIFE. S. C. Wildl. 2(2): 8, 22, illus. Spring 1955.
The trend toward pines and pastures in the South is bringing great destruction of hardwoods. The author shows how dependent many forms of game are on hardwoods and associated plants. Squirrels derive much of their food from hardwoods of many kinds. As for turkeys, "except for a few birds in the mountains, every turkey flock which exists in the Southeastern states today lives and feeds from a headquarters within a swamp. Because of the food they produce, the hardwood trees are a significant part of this heavily grown habitat." "In South Carolina, deer live only in those areas where hardwood trees and shrubs provide them the cover and food they require." Ruffed grouse require hardwoods, but their mountain habitat is thought to be safe. Other game birds that make a great deal of use of foods from hardwoods are quail, wood ducks, and mallards. "The steady increase in pine plantings and pasture lands...means less and less land suitable for wildlife. Pines furnish little food and cover for wildlife."

Johnson, Fred W., and Lowell Adams. (US Forest Serv., Missoula, Mont.) SOME LESSONS FROM EUROPE IN FOREST-BIG GAME MANAGEMENT. J. Forestry 53(6): 436-438, illus. June 1955.
Large deer populations are prevented from ruining managed forests of Europe by 3 means: 1. Annual harvest of about 30% of deer. 2. Winter feeding of mast and cured mountain hay. 3. Fencing of forest tracts for periods long enough for good establishment of young forest growth. This paper deals mainly with the third approach. Calculations indicate that temporary fencing of 1 sq. mi. tracts in the U. S. would be cheaper by far than planting seedlings. A fence would not only permit forest reproduction; it would also permit growth of much fine browse that would be available as soon as fence was removed.

Marshall, Wm. H., T. Schantz-Hansen, and K. E. Winsness. (U. Minn.) EFFECTS OF SIMULATED OVERBROWSING ON SMALL RED AND WHITE PINE TREES. J. Forestry 53(6): 420-424, graphs. June 1955.
Young red and white pines in Minn. were clipped at various intensities for several years. Methods and results are described in detail. For white pine, severe clipping 1 year had little lasting effect, but if done for 2 years was fatal. For red pine, severe clipping through the years had bad effects but was not fatal. In both species, importance of repetition of clipping was shown.

WILDLIFE--MANAGEMENT--FOREST AND RANGE--Continued

"These data indicate that 1, 2, or even 3 years of overbrowsing may be tolerated by well established conifers which can then recover in growth rate and form. It is the authors' belief that at times 'deer damage' is exaggerated by persons who, observing 1 year's browsing, conclude the trees are ruined. These results place added emphasis on the necessity for action by wildlife managers to alleviate population conditions that cause overbrowsing as soon as possible, since quick action will probably permit the trees to survive and recover from the damage."

Metcalf, Vernon. THE STOCKMEN'S VIEWS OF WILD LIFE ON FEDERAL LANDS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 22-26. May 1954. [1955.]
Authoritative presentation of views of stockmen who feel that they should have more rights in connection with federal grazing lands. Economic problems faced by stockmen under present situation are explained, and the legislative aims of these stockmen are justified.

Woodward, Hugh B. (Natl. Wildl. Fed.) PUBLIC VALUES IN WILDLIFE ON FEDERAL LANDS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 27-34. May 1954. [1955.]
Discussion of and figures on the public's interest in public lands, with special reference to western grazing lands. Group discussion of proposed legislation on grazing lands follows this paper.

WILDLIFE--MANAGEMENT--WET-LAND

Baumgartner, L. L. (Baumlanda Hort. Res. Lab.) A CASE HISTORY OF A MIS-APPLICATION OF CMU FOR AQUATIC WEED CONTROL. Proc. 9th An. Meeting NE. Weed Control Conf. p. 559-562, mimeo. Jan. 1955.
Following CMU application to the waters and drawn-down borders of an Ohio lake, there was death of a large number of trees as far as several hundred feet from the lake. Underground drainage was found to have carried CMU inland.--L. F. Stickel.

Huckins, Robert K. (N. J. Fish. Lab., Milltown.) AQUATIC WEED CONTROL STUDIES IN NEW JERSEY / A PROGRESS REPORT. Proc. 9th An. Meeting NE. Weed Control Conf. p. 519-534, mimeo. Jan. 1955.
"A three year study on the effects of a variety of chemicals as aquatic weed control agents has yet to yield any definite management recommendations for the general control of submersed aquatics." Detailed results of tests are given. Aquarium testing was judged of limited value for field application.--L. F. Stickel.

Mackenthun, Kenneth M. (St. Board of Health, Madison, Wis.) THE CONTROL OF SUBMERGENT AQUATIC VEGETATION THROUGH THE USE OF SODIUM ARSENITE. Proc. 9th An. Meeting NE. Weed Control Conf. p. 545-557, mimeo. Jan. 1955.
Practical operational procedures and considerations are discussed.--L. F. Stickel.

Nelson, Noland F. (Utah Game Dept.) FACTORS IN REVEGETATING SALINE MARSH AREAS. Proc. 34th An. Conf. West. Assn St. Game & Fish Comms. p. 258-263. May 1954. [1955.]
Discussion of salinity in relation to soils and plant growth at Ogden Bay Refuge, Utah. Salinity tolerances of 11 important marsh plants are tabulated. Effects of salinity and soils on plant succession are described. Salinity is best measured and expressed by electrical conductivity of soil solutions.

WILDLIFE--MANAGEMENT--WET-LAND--Continued

Nelson, Noland F. (Utah Dept. Game.) FACTORS IN THE DEVELOPMENT AND RESTORATION OF WATERFOWL HABITAT AT OGDEN BAY REFUGE, WEBER COUNTY, UTAH. Utah St. Dept. Fish & Game, Pub. no. 6 of Fed. Aid Div. 1-87 p., illus. [1955.]
Important and attractive bulletin that discusses history, development, and ecology of this management area. Most of the tract formerly was barren salt flat. Botulism losses were extreme. Now the refuge has a series of freshwater marshes, pools, and streams in which waterfowl and muskrat foods grow abundantly. Breeding birds increased more than 500%, hunters shot 33,544 ducks in 1953, botulism losses declined to a relatively low level, and trappers took over 12,500 muskrats in spring of 1954. Factors involved in this change are discussed in considerable detail. They include: plant succession on various sites, water depth and fluctuation, depth of water table, soil salinity, silt, pollution, elimination of grazing, effects of carp and muskrats. Practically all the plants that make the refuge such a fine waterfowl area became established naturally when conditions were altered to favor them. The few attempts at artificial propagation were mostly failures. Control of cattail is becoming necessary, but may be achieved simply by drying sections of the refuge and allowing salt to accumulate on the surface. One of the main problems is to get more water for expansion of refuge and control of botulism.

Steenis, John H. (Patuxent Refuge, Laurel, Md.) WEED CONTROL IN MARSHES. Proc. 9th An. Meeting NE. Weed Control Conf. p. 513-517, mimeo. Jan. 1955.
Vulnerability of marsh weeds to chemical and other control measures depends on the stage of growth, the nature of the habitat (terrestrial, flooded, tidal), geographic location, and species of weed. Relative values of various methods of Phragmites control are discussed.--L. F. Stickel.

WILDLIFE--MANAGEMENT--PREDATION, CROP DAMAGE, AND CONTROL

Sampson, Frank W., and Allen Brohn. (Mo. Cons. Comm.) MISSOURI'S PROGRAM OF EXTENSION PREDATOR CONTROL. J. Wildl. Mgt. 19(2): 272-280. Apr. 1955.
Compared to bounties and salaried trappers, the extension training of farmers in simplified trapping techniques has proved to be the most satisfactory system of reducing damage to livestock and poultry caused mostly by coyotes and foxes. Details of organization, operation, and results of this program started in 1945 and currently sponsored by the Mo. Cons. Comm., are discussed. Data are tabulated on the extent of extension trapping activities and farmer questionnaire returns reporting predator catches, trapping time, and reduction in livestock losses. During eight years of operation, 16,000 interested farm people attended 635 demonstrational meetings that were usually initiated and arranged through agricultural extension agents. Over 5,800 of these farmers felt the need for and received field trapping instruction from two extension trappers. Most of them applied their training and were well satisfied with their effort. Results reported by over 1,100 farmers included an average annual catch of 9.2 predators with an average of 5.4 trapping hours per catch and a reduction in livestock losses of 81%.--F. W. Sampson.

Shick, Charles, compiler. CONTROL OF NUISANCE WILD ANIMALS AND BIRDS. Mich. St. Coll. and Mich. Dept. Cons., Inf. Circ. no. 93. ii + 19 p., processed. Apr. 1955.
Up-to-date information for laymen on control of many sorts of birds, mammals, and reptiles. Tells where further data on various topics can be obtained.

WILDLIFE--REPORTS OF ORGANIZATIONS

Farley, John L. ANNUAL REPORT OF THE DIRECTOR, FISH AND WILDLIFE SERVICE, TO THE SECRETARY OF THE INTERIOR. Annual report of the Secretary of the Interior for the fiscal year ended June 30, 1954. 299-332 p. 1955.
Sketches activities of the F&WS. A special feature is an official explanation of what has been done with duck stamp funds. As pointed out elsewhere, much of the money has been used for improvements of huge areas acquired without the necessity of purchase.

WILDLIFE--REPORTS OF ORGANIZATIONS--Continued

INTERNATIONAL ASSOCIATION OF GAME, FISH AND CONSERVATION COMMISSIONERS, 44TH CONVENTION, SEPT. 16-17, 1954, SEATTLE, WASH. 1-168 p. [1955.] $2.00 from V. E. Joslin, 1356 N. Avon, St. Paul 13, Minn.

Publications of this series reflect current thinking of leading wildlife administrators and their official committees on many topics of general importance. Some papers of the present volume are: Relationship between forest and game management, by G. A. Griffith. Conflicting water uses, by Edson Dow. Report of National Water Policy Committee, by G. E. Eddy. Report of Wildlife Conservation Planning Committee, by T. L. Kimball. Report of National Land Use Policy Committee, by J. A. Biggs. Landowner-sportsman relationships, by C. E. Greenlay. Report of Committee On The Introduction of Exotic Animals, by M. O. Steen. Proposal for action on wildlife legislative program, by C. D. Shoemaker. Report of Federal Aid Committee, by Ben Glading. A review of business planning and fiscal affairs in conservation departments, by I. N. Gabrielson. The Canadian waterfowl situation, by W. W. Mair. A long range migratory waterfowl refuge program, by J. L. Farley.

International Union for the Protection of Nature. THE POSITION OF NATURE PROTECTION THROUGHOUT THE WORLD IN 1950. ADDENDUM. Internat. Union Prot. Nat., Rue Montoyer, 42, Brussels, Belgium. viii + 151 p. 1954.

In French and English. Additions to the original report (see WR 70: 15) based on response to questionnaires sent to each country in order to obtain a general picture.--L. F. Stickel.

International Union for the Protection of Nature. TECHNICAL MEETING, CARACAS, VENEZUELA, 1952. Internat. Union Prot. Nat., Rue Montoyer, 42, Brussels, Belgium. 556 p. 1954.

Mostly in Spanish, partly in French and English. Published account of meetings previously reviewed (WR 71: 12) from the mimeographed reports.--L. F. Stickel.

International Union for the Protection of Nature. PROCEEDINGS AND PAPERS, FOURTH TECHNICAL MEETING, SALZBURG, 1953. Internat. Union Prot. Nat., Rue Montoyer, 42, Brussels, Belgium. 260 p., illus. 1954.

Papers in German, French, or English. The two major themes of the conference were, "Nature Protection and Tourism" and, "The Protection of Fauna and Flora in High Altitudes."--L. F. Stickel.

Massachusetts. DIVISION OF FISHERIES AND GAME / ANNUAL REPORT 1954. 1-32 p. [1955.]

Includes: report on releases of purchased or game farm animals, account of work of management districts, brief descriptions of PR and Cooperative Wildlife Research Unit projects. Data of research value are given on grouse wing and tail study; deer kill and sex ratio, 1953; and fur harvest and its value, by species. "...grouse population in the fall of 1953 was comprised of 53.4% males, 46.6% females, and 46.1% adults and 53.9% juveniles." Grouse were spotty in distribution and numerous only in the best habitat. Deer harvest was 3,911, with bucks comprising 54.6% of kill. Herd is still healthy and slowly increasing. "During the hunting season a total of 300 cock pheasants were liberated on the [Birch Hill] area. Band returns from 53% of these birds were received and it is believed that about 70% of these birds were recovered by the hunters."

Michigan. SEVENTEENTH BIENNIAL REPORT, 1953-54, THE DEPARTMENT OF CONSERVATION. 251 p., illus. 1955?

Report of Game Division (p. 151-191) is a mine of compactly presented information about Mich. game species and management studies. Habitat improvement work is described and itemized. Studies of the 4 wildlife experiment stations are summarized. Recent data on each species or group of game are presented in significant detail. Pheasants increased to old-time numbers despite high fox populations and very little stocking. Data are given on breeding conditions involved. The Warvel flushing bar continued to be ineffective in reducing pheasant losses. Special deer seasons resulted in greatly increased kill,

WILDLIFE--REPORTS OF ORGANIZATIONS--Continued

brought herd into better balance with range, and led to improved statistical estimates of kill. Longer seasons were placed on grouse, rabbits, and raccoons. Ruffed grouse kill reached a peak, but grouse began their downward cyclic swing. Grouse population of 1 area remained high despite 60% harvest in 2 successive years. A graph shows similarity of grouse fluctuations in a hunted and an unhunted area. Sharp-tails and prairie chickens began cyclic downswing a year or 2 after ruffed grouse. Raccoon disease was found through most of state, but raccoon kill was highest on record. Snowshoe hares continued cyclic downswing, but cottontails increased. Bears were given more legal protection. Hawks and owls were all protected by a new law. Red foxes increased despite bounties. Quantitative data given in this report include: waterfowl kill and its species composition and hunter success; reported take of fur bearers, by species; reported kill, by zones of state, 1948-54, of pheasant, ruffed grouse, sharp-tails and prairie chicken, cottontail, snowshoe hare, fox squirrel, and gray squirrel.

Nevada. REPORT OF THE FISH AND GAME COMMISSION FOR THE PERIOD JULY 1, 1952, TO JUNE 30, 1954, INCLUSIVE. 1-63 p., illus. 1954.
In addition to general information and financial statements, this report gives brief descriptions of management and research projects. Figures are given on total kills of 11 types of game in 1952 and 1953. Statements made about the kills do not agree with the tabulation; possibly the 1952 and 1953 columns were transposed.

New Jersey. ANNUAL REPORT / DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT / DIVISION OF FISH AND GAME / FOR THE FISCAL YEAR COMMENCING JULY 1, 1953 AND ENDING JUNE 30, 1954. 1-52 p. [1955.]
Provides brief reviews of projects and accomplishments. Tables show bags of beavers and deer, by counties, and catches of predators.

Oregon. 1953-1954 BIENNIAL REPORT, OREGON STATE GAME COMMISSION. 48 p., illus. 1955?
Numerous game problems and projects are discussed briefly. Quantitative data are given on hunting pressure, 1915-53; deer harvests, 1948-53; elk harvests, 1952-53; numbers of waterfowl counted, banded, and shot in biennium; game-farm birds released; quail and pheasants harvested, 1950-53; numbers and values of fur animals reported caught in biennium; and predators destroyed. Hunting, 1949-53, was not successful in preventing abrupt cyclic decline of sage grouse, 1951-54. Salt proved ineffective as a tool in managing big game distribution. Successive burns in deer habitat did not improve forage quality. Of 152 wood duck nest boxes checked, 45% were used by wood ducks; production averaged about 300 birds hatched per 100 boxes erected.

PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE FOR THE PROTECTION OF THE FAUNA AND FLORA OF AFRICA, BUKAVU, 26-31 OCTOBER, 1953, BELGIAN CONGO. Ministère des Colonies, Belgium. 571 p. 1954?
In English and French. The position of fauna and flora protection in Africa in 1953 and 1933 is presented for each country. Progress is viewed in light of recommendations made at the earlier conference. Papers on conservation, control, and research comprise the bulk of the book. Discussions of many important problems, and recommendations of the conference, are included in other sections. --L. F. Stickel.

Texas. ANNUAL REPORT OF THE GAME AND FISH COMMISSION FOR THE FISCAL YEAR 1953-1954. 1-59 p. 1955?
Largely a statistical report that includes brief descriptions of research and management projects; figures on deer, turkey, and peccaries released; and figures on predators killed.

MAMMALS--GENERAL

Buckner, C. H. (Forest Biol. Lab., Winnipeg, Man.) SMALL MAMMALS AS PREDATORS OF SAWFLIES. Can. Ent. 87(3): 121-123. Mar. 1955.
Experiments with predation of rodents and shrews on cocoons of larch sawfly demonstrated that factors to be considered were loss of larvae before pupation, length of time during which predation occurs, habitat preferences of mammalian species, and food preferences of these species. Limited data are given on each of these points.

Gandal, Charles P. AGE DETERMINATION IN MAMMALS. Trans. N. Y. Acad. Sci., ser. 2, vol. 16, no. 6: 312-314. Apr. 1954. [From J. Mamm. 36(2).]

Hamilton, W. J., Jr., and W. J. Hamilton, III. (Cornell U.) THE FOOD OF SOME SMALL MAMMALS FROM THE GASPE PENINSULA, P. Q. Can. Field-Nat. 68(3): 108-109. July-Sept. 1954. [May 1955.]
Stomach contents of 40 individuals collected in summer of 1953. Species represented were Sorex cinereus, Sorex fumeus, Sorex gaspensis, Peromyscus maniculatus, Clethrionomys gapperi, and Napeozapus insignis.

Kurtén, Björn. ON THE VARIATION AND POPULATION DYNAMICS OF FOSSIL AND RECENT MAMMAL POPULATIONS. Soc. Fauna et Flora Fennica (Helsinki), Acta Zool. Fennica no. 76. 1-122 p., illus. 1953.
Correlation between tooth crown dimensions in fossil mammal populations is the subject of Part I. In Part II, fossil populations are subjected to life table analysis, and comparisons are made with certain life table studies of recent forms. Methods, results, and problems involved in studies of fossil populations are considered.--L. F. Stickel.

MAMMALS--FAUNAS AND MANUALS

Borell, Adrey E., and Monroe D. Bryant. MAMMALS OF THE BIG BEND AREA OF TEXAS. U. Calif. Pub. Zool. 48(1): 1-62, illus. 1942. 75¢.

Gunderson, H. L., W. J. Breckenridge, and J. A. Jarosz. (U. Minn.) MAMMAL OBSERVATIONS AT LOWER BACK RIVER, NORTHWEST TERRITORIES, CANADA. J. Mamm. 36(2): 254-259. May 1955.
Mammals of this hilly, tundra country were studied in summer 1953. Mammals were few in species and individuals. Lengthy notes are given on observations of Arctic fox and Parry's ground squirrel and short notes are given for bear, wolf, brown and collared lemmings, caribou, and muskox. Muskox of the region have been exterminated.

MAMMALS--COMMUNITIES, NUMBERS, HOME RANGES

Frank, Fritz. EXPERIMENTS ON THE CRASHES OF FIELDMOUSE POPULATIONS (MICROTUS ARVALIS, PALLAS). Zool. Jahrb. (Systematik) 82(1/2): 95-136. 1953.
In German. This important paper presents the results of intensive studies on two crashes of Microtus populations in 1949/50 and 1952/53. It is the most comprehensive study of crash causation published to date. Many collaborators participated in the various specialized aspects of the work. There was a low prevalence of infectious disease or parasitism during these crashes, which seems to relegate these factors at most to secondary roles as causes of mortality. Frank was able, during the 1952/53 period, to produce crashes in penned experimental populations as well as to observe the natural crashes in the field. Data collected from these two sources agree, and the opportunity to study crashes under experimental conditions added considerably to the earlier studies of Green, Larson, and Bell. In every crash studied, the animals exhibited characteristic behavioral changes followed by a typical population-wide hypoglycemic shock syndrome. Blood sugar and other experimental studies were made. The shock picture was reproduced experimentally in individual animals by insulin injection, while the natural phenomenon was reversed by grape sugar injections. Frank

MAMMALS--COMMUNITIES, NUMBERS, HOME RANGES

concludes that the crashes were produced by physiological alterations resulting from the stress of crowding, as postulated by Christian, and triggered by a deficiency in some environmental factor, such as food in the case of his experimental populations. Frank assigns an important role to psychological factors as stressing agents in crowding.--John J. Christian, Naval Med. Res. Inst., Bethesda 14, Md. Reviewer has translation that may be copied.

Frank, Fritz. THE CAUSALITY OF RODENT CYCLES IN THE LIGHT OF RECENT EXPERIMENTS ON THE POPULATION DYNAMICS OF GERMAN MICROTINES (AN INTERIM REPORT). B. Morph. u. Oekol. Tiere. 43: 321-356. 1954.

In German. A discussion of causes of population cycles in the light of recent evidence with particular emphasis on the author's studies. Frank believes that cycles can be explained by interaction of biotic and environmental factors without resort to "cosmic or other incomprehensible influences". Population increase is a function of reproductive potential, with variations in rate of increase being governed by environmental factors. A large area with uniform environmental conditions favors the origin of regular fluctuations (cycles). "The rate of mass increase depends essentially on the 'crowding potential' of the species involved, which may be increased by certain ethological mechanisms". He lists a decrease in territoriality as one such factor. "Population regulation in rodents normally takes place through migration and death... When reproductive potential and space limitations produce crowding, other regulatory mechanisms become operative, first the arrest of reproduction and increased migration and finally a crash, which is prepared by psychic and physical stresses, and is released synchronously by unfavorable weather periods". --John J. Christian, Naval Med. Res. Inst., Bethesda 14, Md. Reviewer has translation that may be copied.

Quick, Horace F. (U. Maine.) SMALL MAMMAL POPULATIONS IN NORTHERN BRITISH COLUMBIA. Can. Field-Nat. 68(3): 95-102. July-Sept. 1954. [May 1955.]

Small mammals were sampled by snap-trapping in 6 major cover types in the Fort Nelson region in autumns of 1947 and 1948. Peromyscus, Clethrionomys, and Sorex were common enough to provide quantitative results. An attempt is made to derive per-acre population figures from the snap-trapping data. Population differences between habitats are shown. The aspen-birch type yielded the most rodents and hence should be favorable for predatory fur animals. Differences between population levels in the 2 years are compared with differences found by De Vos in Ontario. Rodents were 3-4 times more abundant in 1948 than in 1947, but shrews were scarcer.

Williams, Olwen. (U. Colo.) DISTRIBUTION OF MICE AND SHREWS IN A COLORADO MONTANE FOREST. J. Mamm. 36(2): 221-231, illus. May 1955.

Snap-trapping in 9 study plots and along a transect gave data on habitat preferences and relative numbers of mice and shrews in a forested valley on the eastern slope of the Colo. Front Range. Some species were ecologically restricted, others lived in a variety of habitats.

MAMMALS--PARASITES AND DISEASES

Anonymous. THE RABIES PROBLEM [IN FLA.]. Fla. Wildl. 8(12): 24-25, 40, illus. May 1955.

General discussion that includes table of reported occurrence of rabies in mammals in Fla., 1954, by county and species.

Beck, D Elden. (Brigham Young U.) DISTRIBUTIONAL STUDIES OF PARASITIC ARTHROPODS IN UTAH, DETERMINED AS ACTUAL AND POTENTIAL VECTORS OF ROCKY MOUNTAIN SPOTTED FEVER AND PLAGUE WITH NOTES ON VECTOR-HOST RELATIONSHIPS. Brigham Young U. Sci. Bul., Biol. Ser. 1(1). 64 p., illus. Mar. 1955.

A careful study of identity and distribution of known vectors of plague and spotted fever in Utah, and of distribution and identity of their hosts. Identifications of plague vectors are limited to fleas and those of spotted fever to

MAMMALS--PARASITES AND DISEASES--Continued

ticks. "Of the 68 species and subspecies of plague-implicated mammals in the western United States, 41 species and subspecies are represented in Utah. There is not a single county without one or more plague-implicated mammal species being present and widely distributed, and from which plague-implicated vectors have been taken." Vectors are classified as being capable (natural) or potential (experimental) vectors. "Both capable and potential vectors have wide geographic distribution and variable host adaptation. ...Efficient plague-implicated vectors of several species, and plague-implicated hosts, are found densely distributed where human populations are most highly concentrated in the state." Vector-host relationships and seasonal variations in vector populations throughout the state are discussed.--R. J. Myklebust.

Colson, Ralph, W. S. Stone, and D. J. Dean. (N. Y. Cons. Dept.) RABIES [IN N. Y. STATE.] N. Y. St. Cons. 9(5): 8-12, illus. Apr.-May 1955.
Good discussion of past and present rabies problem in state and what is being found and done about it. The present system of trapping foxes in zones 50 miles wide around epidemic areas has not been satisfactory in controlling the disease. A more effective method based on poison is being sought. Known incidence of rabies in several species of mammals, 1941-54, is graphed.

Davis, Betty Schuck. STUDIES ON THE TRYPANOSOMES OF SOME CALIFORNIA MAMMALS. U. Calif. Pub. Zool. 57(3): 145-250, illus. 1952. $1.50.

Larson, C. L., Wm. Wicht, and Wm. L. Jellison. (US Pub. Health Serv., Hamilton, Mont.) A NEW ORGANISM RESEMBLING P. TULARENSIS ISOLATED FROM WATER. Pub. Health Reps. 70(3): 253-258. Mar. 1955.
New disease related to tularemia is described. The microbe, Pasturella novicida, is also new. These organisms were isolated from turbid water at Ogden Bay Refuge, Utah, at a spot where dead muskrats were found. The disease proved highly pathogenic for various laboratory mammals. Lesions are similar to those of tularemia.

MAMMALS--SHREWS, MOLES, BATS

Beer, James R. (U. Minn.) SURVIVAL AND MOVEMENTS OF BANDED BIG BROWN BATS. J. Mamm. 36(2): 242-248. May 1955.
Conclusions: "This study is based on some 3871 bats banded between 1940 and 1953. The returns...indicate that this species does not travel great distances. A maximum distance of 33 miles for summer and 61 miles for winter movements was found. Most of the movements both winter and summer were within a 10 mile radius of the point of banding. A mortality rate of about 40 per cent per year was calculated with higher mortality rates being recorded for the years immediately following banding. These figures are based on a population that is declining in numbers. A sex ratio of about 68.1 per cent males was obtained and there appeared to be no differential mortality between the sexes in the adult bats. The males are more prone to move from the point of original banding than are the females."

Buckner, C. H. (Forest Biol. Lab., Winnipeg, Man.) A SIMPLE PERMANENT LIVETRAP PLOT FOR SHREWS. J. Mamm. 36(2): 286. May 1955.
Quart oil cans with tops removed are "imbedded grid fashion on the plot flush with the ground level and baited with raw liver or ground beef." Cans are lifted out to permit handling of animals, and are inverted in ground when trapping is suspended. Most shrews were alive and well in these traps. Young microtines were also taken successfully.

Clothier, Ronald R. (Kans. Wesleyan U.) CONTRIBUTION TO THE LIFE HISTORY OF SOREX VAGRANS IN MONTANA. J. Mamm. 36(2): 214-221. May 1955.
Age and longevity, lack of variation of size with age after leaving nest, altitudinal distribution, habitat, time of activity (active throughout day and throughout year), animal associates, food habits, reproduction, weights, dermal glands, molts.

MAMMALS--SHREWS, MOLES, BATS--Continued

Enright, John B., and others. (U. Calif., Davis.) ISOLATION OF RABIES VIRUS FROM AN INSECTIVOROUS BAT (TADARIDA MEXICANA) IN CALIFORNIA. Proc. Soc. Exp. Biol. & Med. 89(1): 94-96. May 1955.
Rabies has been found in bats of Fla., Pa., Texas, Calif., and Mont.

Kangur, Rudolph. SHREWS AS TREE SEED EATERS IN THE DOUGLAS FIR REGION. Ore. St. Bd. Forestry (Salem), Res. Note no. 17. ii + 23 p., illus. Dec. 1954.
Cage tests and field acceptance tests revealed that shrews ate much tree seed. "In captivity they ate from 185 to 250 Douglas fir seeds in a 24 hour period (this much seed is equivalent to one-half their body weight). In the field they took from 50 to 100 per cent of all Douglas fir seed placed in acceptance spots in each three-day test period. Sitka spruce, usually considered to be safe from seed eating mammals, was taken from 15 to 55 per cent. The amount of 'take' varied with the season of the year. More tree seeds were eaten in the winter and early spring when natural foods were scarce... The general conclusion reached was that positive control measures for shrews, as well as for deer mice (Peromyscus), is a must for any direct seeding project, or for any program of baiting mammals to protect natural seed fall."

Krutzsch, Philip H. (U. Pittsburgh, Pa.) OBSERVATIONS ON THE MEXICAN FREE-TAILED BAT, TADARIDA MEXICANA. J. Mamm. 36(2): 236-242. May 1955.
Habitats, roosting sites, sizes of colonies, associated species of bats, reproduction, development, parental care, behavior of young, foraging habits, diurnal activity pattern, foods, seasonal abundance, parasites, predators.

Miller, Jerome Stapleton. A STUDY OF THE ROOSTING HABITS, AND OF THE ENVIRONMENTAL FACTORS CONCURRENT WITH TIME OF EVENING FLIGHT, OF LITTLE BROWN BATS (MYOTIS LUCIFUGUS) IN NORTHERN LOWER MICHIGAN. Ph.D. thesis, U. Mich. 97 p. 1955. [From long abstract in Dissertation Abstracts 15(4).]
"In Part I of the study, data are presented on abundance, recapture ratio, sex ratio, seasonal occurrence, weather influences on abundance, time of roosting, relations of other bat populations to that of the Station, distant recaptures, return of bats released during previous homing experiments, and roosting site preferences... In Part II, the time of evening emergence of an isolated colony of little brown bats is shown to be highly correlated with certain intensities of twilight illumination."

Pearson, Oliver P. (MVZ, U. Calif., Berkeley.) SHREWS. Sci. Am. 191(2): 66-68, 70. Aug. 1954. [From J. Mamm. 36(2).]

MAMMALS--RABBITS AND PIKAS

Anonymous. A METHOD FOR CONTROLLING THE DAMAGE TO ORCHARDS CAUSED BY THE FIELD HARE. Suomen Riista 8: 135. 1953.
In Finnish with English summary. "A method used in 1904-05...is described... The recipe consists of 4 kg. soap, 125 gr. naphthalene, 3 spoonfuls of turpentine and 3 spoonfuls of some vegetable oil. These materials added to 10-15 litres of water will be sufficient for handling 300-450 apple trees. According to the report, success in 1904-05 was complete."

Anonymous. [BENEFITS FROM MYXOMATOSIS IN FRANCE.] Internat. Union Prot. Nat. Bul. 4(1): 3. 1955.
"France: The regrowth of vegetation on the sand-dunes of the Somme and Pas de Calais has resulted from the rabbit's disappearance. The return of stabilizing vegetation, especially the oyat, is a boon to the region's farmers who vigorously oppose any measures to effect the animal's return." [This note is especially significant because it reflects part of the situation in a country where the European rabbit is truly native.]

MAMMALS--RABBITS AND PIKAS--Continued

Anonymous. PENNSYLVANIA FARMERS ASK BAN ON SAN JUAN RABBITS. Md. Sportsman 13(3): 10. Mar. 1955.
Importation of San Juan rabbits into Pa. "was roundly denounced last month at the annual meeting of the State Council of Farm Organizations, as reported in the FARM BUREAU MIRROR, Pennsylvania's farm newspaper. The group passed a resolution that demanded immediate stoppage of the imports and export or extermination of such animals now in the state. 'The resolution was passed without a dissenting vote by delegates representing about 40 statewide farm organizations after it was jointly introduced by representatives of the nurserymen's, fruit grower's, and vegetable grower's organization. Calling upon the State Department of Health to discontinue issuance of permits to import the rabbits, the resolution declared the animals can be more destructive to farm crops than Japanese beetles, English sparrows, Starlings and Dutch elm disease--all of which were imported into this country either accidentally or in ignorance.'"

Bern, H. A., and Boris Krichesky. ANATOMIC AND HISTOLOGIC STUDIES OF THE SEX ACCESSORIES OF THE MALE RABBIT. U. Calif. Pub. Zool. 47(7): 175-196, illus. 1943. 35¢.

Bowers, Glenn L. (Pa. Game Comm.) UNUSUAL BREEDING OF COTTONTAILS IN PENNSYLVANIA. J. Mamm. 36(2): 303. May 1955.
One was found pregnant in Dec., one in Jan. Some females were found to breed in summer and fall of calendar year of their birth. Perhaps such females are responsible for the late breeding records.

Bowers, Robert R. (W. Va. Cons. Comm.) THE SAN JUAN RABBIT...AN ARM LOAD OF TROUBLE. W. Va. Cons. 19(2): 3-5, 23, illus. Apr. 1955.
Strong review of evidence against introductions of this rabbit. The W. Va. legislature has given authority for barring introduction of San Juan rabbits into state. Some are thought to have been brought in illegally. [Other states known to have banned San Juan rabbits are Ohio, Missouri, and Va.]

Crunden, Charles Walter. TECHNIQUES IN THE ESTIMATION OF A MEARNS COTTONTAIL POPULATION. M. S. thesis, Iowa St. Coll. iii + 73 p. [Copy in US Dept. Int. Library.] 1954.

Davids, Richard C. SAN JUAN RABBITS: WANT 'EM ON YOUR FARM? Farm Journal, May 1955. p. 33, 150, illus. May 1955.
This general article on the evils of introducing European rabbits contains some statements worth quoting: "...when we questioned scientists and specialists from coast to coast this month, we found them in surprising agreement that: the San Juan rabbit is a dangerous threat to agriculture, and failing to stop their shipment is outright stupidity." "We asked Melvin O. Steen, Missouri's game chief, what he thought. Steen heads a national committee on game introductions. 'I recommend that American farmers act and act fast,' he said. 'Trap these rabbits, shoot 'em, gas 'em. Don't let up until we've wiped out the last one alive in the U. S. Then go one step further. Insist that your legislature pass laws prohibiting any more releases. An Australian wildlife scientist told me: "Americans are insane to take any chance whatever with that animal." What are we doing it for?' Why indeed?"

Ecke, Dean H. (Santa Clara Co., Calif., Health Dept.) THE REPRODUCTIVE CYCLE OF THE MEARNS COTTONTAIL IN ILLINOIS. Am. Midl. Nat. 53(2): 294-311, illus. Apr. 1955.
From summary: "Mating behavior is described from actual observation. The breeding cycle of both male and female rabbits is demonstrated with photomicrographs of testis and ovaries sections, and is supported by actual field observations of nests and the recording of pregnant females from collections. Descriptions and accounts are also offered of resorption, lactation, factors controlling rabbit reproduction, raising of young, growth and behavior of young, rate of reproduction, and accounts of rabbits breeding in their first year."

MAMMALS--RABBITS AND PIKAS--Continued

Gaffrey, G. ZUR ERNÄHRUNGSWEISE DES WILDKANINCHENS, ORYCTOLAGUS CUNICULUS (LINNÉ, 1758). Säugetierk. Mitteil. (Stuttgart) 2(2): 80. Apr. 1954. [From J. Mamm. 36(2).]

Graf, William. (San Jose St. Coll.) COTTONTAIL RABBIT INTRODUCTIONS AND DISTRIBUTION IN WESTERN OREGON. J. Wildl. Mgt. 19(2): 184-188. Apr. 1955.
The eastern cottontail rabbit Sylvilagus floridanus (probably S.f. mearnsi) was successfully introduced into Benton County in 1939 and into Linn County in 1941. By mid-summer 1953 the Linn County population had spread over about 175 to 200 sq. mi. of range. The Benton County population has equaled this rate of spread. The distribution pattern in Linn County shows strikingly the effect of barriers and of favorable avenues on the rate and direction of distribution. Eastward distribution across stream barriers is about 6 miles as compared to 17 miles southward along favorable avenues. The rabbits are a successful addition to the game fauna of the Willamette Valley since no game species now occupies this niche. There appears to be little conflict with economic interests or with native species at this time.--Wm. Graf.

Hamilton, W. J., Jr. (Cornell U.) COPROPHAGY IN THE SWAMP RABBIT. J. Mamm. 36(2): 303-304. May 1955.
Good evidence that reingestion is practiced by S. palustris. [First evidence of this sort for any American lagomorph.] Author has not found signs of reingestion in the common cottontail of N. Y. Notes are given on ecology of swamp rabbit in Fla.

Höglund, Nils, and Johan Viklund. DETERMINING THE SEX OF YOUNG HARES. Suomen Riista 8: 175-176, illus. 1953.
In Finnish with English summary. "The article is a translation of a paper published in the Swedish journal 'Svensk Jakt' (1953, No. 5). The determination... is done in the way indicated in the pictures. When the skin at the base of the tail and round the sex opening is pressed down the organs concerned will be seen. Fig. 1 shows the hare from above, Fig. 2 from the side. The sex opening of the male is roundish, that of the female more like a slit and a chute. There are also differences in color."

MacNamara, L. G. (N. J. Div. Game.) THE PRESENT STATUS OF THE SAN JUAN RABBIT IN NEW JERSEY. N. J. Outdoors 5(12): 4-9, illus. June 1955.
Large numbers of San Juan rabbits have been liberated in New Jersey and others are being bred. So far they have persisted in the wild in only 1 place, which was especially suitable. The rabbits seem to be unwary. No burrowing has been observed. Introduction of European rabbits into N. J. in early 1900's failed. The animal is not expected to afford good sport to beaglers because of its habits. Money spent on San Juans would do more good if used to improve conditions for cottontails. The N. J. Div. of Fish & Game has no authority to prohibit importation of San Juan rabbits.

Majors, Edward. POPULATION AND LIFE HISTORY STUDIES OF THE COTTONTAIL RABBIT IN LEE AND TALLAPOOSA COUNTIES, ALABAMA. M. S. thesis, Ala. Polytechnic Inst. xvi + 119 p., illus. Processed. Aug. 1955. [Sic.] [Produced in limited numbers for deposit only in libraries of major schools offering training in game management.]
Live trapping and other work conducted for 2 years gave data on size of populations in various habitats and on breeding biology. Best bait was shelled corn and apple. The most successful traps were on travel lanes. Estimated populations are given for certain tracts and index counts are given for borders of different sorts. A woods-pasture border of poor cover had 12.2 rabbits per mile in Mar., 2.2 a year later after marked reduction of cover, and 7.8 after 1 season of recovery. Rabbits apparently used woods in winter, scattered over fields in summer. Type of crop grown next to woods probably influences population. Woods edge with good cover next to pasture should be favorable. Maximum possible percentage of young on 2 study areas was 75%. Only 12% (males) and 28% (females) of 42 rabbits caught in Jan.-Feb. were over 1 year old.

MAMMALS--RABBITS AND PIKAS--Continued

Females seemed to live longer than males. Sex ratio was 93.3 males per 100 females. Males averaged 2.41 lbs., females 2.6 lbs. Breeding season extended from Jan. to Sept. Litter size varied from 1 to 7, av. 3.1. Rabbits used "forms" throughout year, but those of summer were more elaborate than those of winter.

Mossman, Archie S. (U. Wis.) REPRODUCTION OF THE BRUSH RABBIT IN CALIFORNIA. J. Wildl. Mgt. 19(2): 177-184, graphs. Apr. 1955.

The breeding season, roughly Dec. to June, as shown by the gross relationships of the testes and accessory reproductive glands in male Sylvilagus bachmani, is compared to the breeding season of the females. Gestation period is estimated to be about 27 days. A table which is given will allow reasonably accurate aging of embryos. Since females apparently breed soon after giving birth, a female living through the entire breeding season could raise a maximum of 6 litters, with 3 or 4 litters the most likely. Litters contained 2-6 young, with an average of 3.69 for 26 litters. Thus each adult female is potentially capable of producing about 12 to 16 young per season. Sex ratio in 27 sexable embryos was 1:1. The ratio in 40 post-natal individuals was 88 males:100 females. 24 embryos were found in the right uterine horn and 29 in the left, 33 recent corpora lutea in the right ovary and 42 in the left. Wastage of 2 eggs was noted. There was no indication that ova had crossed to opposite uterine horns. Pregnant females of S. bachmani probably do not copulate. Ovarian structures resemble those of the domestic rabbit Oryctolagus cuniculus. Minimum embryonic resorption rate was 12.5% of ovulations. This is probably several times smaller than the actual resorption rate.--Archie S. Mossman.

Myers, K. STUDIES IN THE EPIDEMIOLOGY OF INFECTIOUS MYXOMATOSIS OF RABBITS. II. FIELD EXPERIMENTS, AUGUST-NOVEMBER 1950, AND THE FIRST EPIZOOTIC OF MYXOMATOSIS IN THE RIVERINE PLAIN OF SOUTHEASTERN AUSTRALIA. J. Hygiene 52(1): 47-59, illus. Mar. 1954. [From J. Mamm. 36(2).]

Parlaman, Robert D. (Pa. Game Comm.) WANT MORE RABBITS? Pa. Game News 26(6): 10, illus. June 1955.

A "simple but successful" technique for cottontail management. A 4-foot swath was mowed through heavy briars with a scythe and a few small trees were removed. The curving, cut strip was cleared of sticks and stones so it could be mowed easily. Clovers and grasses sprang up in the strip. The strip was mowed twice a week with ordinary lawnmower. Rabbits of all ages took advantage of the proximity of food and cover; 9 were seen in a 50-yard strip. This technique ordinarily requires no planting, but in some spots it may be necessary to prepare a seed bed and do some liming and seeding.

Philip, Cornelius B., J. Frederick Bell, and Carl L. Larson. (US Pub. Health Serv., Hamilton, Mont.) EVIDENCE OF INFECTIOUS DISEASES AND PARASITES IN A PEAK POPULATION OF BLACK-TAILED JACK RABBITS IN NEVADA. J. Wildl. Mgt. 19(2): 225-233, illus. Apr. 1955.

Black-tailed jack rabbits in northern Nev. were observed for evidence of contact with disease agents and arthropod parasites during a peak population. Sera collected during the summers of 1951 and 1952 had no agglutinins against B. tularense, but had antibodies against western equine encephalomyelitis and Colo. tick fever viruses, spotted feverlike rickettsia, and Br. abortus. Isolations of B. tularense, a rickettsial agent related to Rocky Mountain spotted fever, and the virus of Colo. tick fever, were obtained for the first time from the rabbit tick, Dermacenter parumapertus, parasitizing these hares. The soft tick, Otobius lagophilus, was also apparently infected with the last two pathogens. The cause of localized decimation among hares in 1951 was not determined. In 1952, hares in some areas had excessive infestations of Cuterebra bot parasites causing some deaths. Ticks were not unusually abundant in either year. The influence of any of these factors on generalized die-off, or directly or indirectly on human disease in northern Nev. was not determined.--Authors' summary.

MAMMALS--RABBITS AND PIKAS--Continued

Rosene, Walter, Jr. (US F&WS, Gadsden, Ala.) BICOLOR AS A RABBIT FOOD. J. Wildl. Mgt. 19(2): 324. Apr. 1955.
Utilization of Lespedeza bicolor by rabbits was studied on Oakland Club near Pineville, S. C., in the spring of 1954. Stems between 0.077 and 0.285 inch were severed by wild cottontail rabbits so seed could be eaten from heads. Height of stems before gnawing varied from 21 to 59 inches. Taller plants with larger stems had been barked without the stems being cut sufficiently to cause the seed heads to bend over. As food, seeds seemed to be preferred over bark.--Walter Rosene, Jr.

Sheffer, Dale E. (Md. Game Comm.) THE RABBIT PROPAGATION STUDY AT GWYNNBROOK STATE GAME FARM. Md. Cons. 32(3): 23-24, illus. May 1955.
In spring of 1954 a 70-acre tract was tightly fenced and stocked with 28 marked cottontails. Live trapping and use of Lincoln ratio indicated population of about 114 rabbits in enclosure in Nov. 1954. Before stocking, the tract was equipped with brush piles and many food plantings. It is planned to trap rabbits from the enclosure for restocking in fall of 1955. Within the large enclosure, pens of 50 x 50 feet are being tried with varying numbers of breeders. Supplemental feed is used in winter in small pens.

Woodbury, Angus M. (U. Utah.) ECOLOGY OF THE GREAT SALT LAKE DESERT. I. AN ANNUAL CYCLE OF THE DESERT JACKRABBIT. Ecol. 36(2): 353-356. Apr. 1955.
Rabbits were counted on census drives in four study areas. Counts were made each month from Sept. 1952 to Oct. 1953.--L. F. Stickel.

MAMMALS--RODENTS--MISCELLANEOUS

Doran, David J. COCCIDIOSIS IN THE KANGAROO RATS OF CALIFORNIA. U. Calif. Pub. Zool. 59(2): 31-60, illus. 1953. 50¢.

Doran, David J. (Natl. Agr. Res. Center, Beltsville, Md.) A CATALOGUE OF THE PROTOZOA AND HELMINTHS OF NORTH AMERICAN RODENTS. IV. TREMATODA. Am. Midl. Nat. 53(2): 446-454. Apr. 1955.
Consists of 3 sections: 1. List of worms with indication of host, locality, and reference. 2. List of references. 3. Host index to trematode and nematode parts of this series, of which this is 4th and last.

Dunaway, Paul B. (US F&WS, Orangeburg, S. C.) LATE FALL HOME RANGES OF THREE GOLDEN MICE, PEROMYSCUS NUTTALLI. J. Mamm. 36(2): 297-298. May 1955.
Three females that used the same nests had long, narrow ranges. Two ranges were almost separate, but were overlapped by the third.

Godfrey, Gillian K. (Bur. An. Pop., Oxford U., Eng.) OBSERVATIONS ON THE NATURE OF THE DECLINE IN NUMBERS OF TWO MICROTUS POPULATIONS. J. Mamm. 36(2): 209-214. May 1955.
Summary: "In a live-trapping study, two isolated populations of field voles (Microtus agrestis), half a mile apart, were found to decrease in different years. The severe mortality at the time did not appear to be the result of unusual environmental conditions. The field observations were not inconsistent with the hypothesis advanced by Chitty (1952) that, in the year of the crash, the overwintering animals are abnormal from birth as a consequence of strife among their parents in the previous breeding season."

Herold, W. BEOBACHTUNGEN ÜBER DEN WITTERUNGSEINFLUSS AUF DEN MASSENWECHSEL DER FELDMAUS. Zeitschr. Säugetierk. (Berlin) 19(1-2): 86-107. July 1954. [From J. Mamm. 36(2).]

MAMMALS--RODENTS--MISCELLANEOUS--Continued

Jameson, E. W., Jr. (U. Calif., Davis.) SOME FACTORS AFFECTING FLUCTUATIONS OF MICROTUS AND PEROMYSCUS. J. Mamm. 36(2): 206-209. May 1955.

Peromyscus populations are governed largely by effect of supply of seeds and berries on reproduction. Consequently, population fluctuations are irregular. Microtus depends on vegetative growth, which is more dependable than mast. Microtus may destroy its own habitat, which Peromyscus apparently cannot. The widespread synchronization of some microtine cycles remains a puzzle, but may tie in with stress phenomena. Effect of stress on Peromyscus and Microtus should be compared. Peromyscus and Apodemus should be compared in respect to factors affecting populations. One sound approach to the cycle problem is to find out why and how given populations and species fluctuate, and then make comparative studies. Search for a single grand theory to explain cycles may actually be undesirable.

Lindeborg, Robert G. (N. M. Highlands U.) WATER CONSERVATION IN PEROGNATHUS AND PEROMYSCUS. Ecol. 36(2): 338-339. Apr. 1955.

Laboratory measurements were made of water loss through evaporation. Field-caught mice were used. Perognathus lost significantly less moisture than did Peromyscus, although both were from xeric habitats. Another species of Peromyscus from a mesic habitat lost somewhat more moisture than its relative. --L. F. Stickel.

Read, Clark P., and Raymond E. Millemann. HELMINTH PARASITES IN KANGAROO RATS. U. Calif. Pub. Zool. 59(3): 61-80, illus. 1953. 35¢.

Scheffer, Victor B. (Colo. A & M Coll.) IS MIMA MOUND MICRORELIEF CONFINED TO WESTERN NORTH AMERICA? (Son exclusivos del oeste de Norteamerica los micromonticulos de tipo mima?) Investigaciones Zool. Chilenas 2(6): 89-94, illus. Oct. 1954.

In Spanish. English translation of CONCLUSIONES: "The important evidence in favor of the gopher theory of origin of Mima mound microrelief may be summed up as follows: (1) Mima mounds are known only from the range of the gopher; (2) the mounds are a distinct type, regardless of wide variation in their environment of bedrock, topography, soil, and climate; (3) the mounds contain no residual or deposited rocks larger than those which a gopher might carry; (4) the mounds are generally circular in shape as seen from above, even when they sit on sloping ground. This distinguishes them from the mounds, ridges, and hillocks which are produced by the ordinary physical agencies of weathering, erosion, and deposition. Such agencies employ moving forces and they tend to produce elongated earth-forms, especially on sloping ground. The author will be interested to learn whether Mima-type microrelief has been observed in other parts of the world and, if so, whether it is associated with the presence of fossorial rodents. Communications are solicited."--V. B. Scheffer.

Voris, John C., James D. Yoakum, and Charles F. Yocum. (Humboldt St. Coll., Calif.) NOTES ON CHINCHILLA LIBERATIONS IN CALIFORNIA. J. Mamm. 36(2): 302. May 1955.

"In summary, at least two known liberations of chinchillas in California have been made with culled animals from fur farms, and although releases were made in different environments, no known survivals have been recorded."

Wijngaarden, A. Van. BIOLOGY AND CONTROL OF THE WATER VOLE, ARVICOLA TERRESTRIS TERRESTRIS (L.) IN THE NETHERLANDS. Verslagen en Mededelingen van de Plantenziektenkundige Dienst te Wageningen no. 123. 1-147 p., illus. June 1954. fl4.50.

In Dutch with 3-page English summary. Description, variation, distribution, signs of presence, trapping, toe-clipping, habits, habitat, foods, histological study of reproductive condition throughout year, growth and development, age characteristics, longevity, population changes during year, sex ratios, enemies, parasites, diseases, population level, damage done to crops, control methods.

MAMMALS--RATTUS AND MUS

Barnett, S. A., and A. H. Bathard. POPULATION DYNAMICS OF SEWER RATS. J. Hygiene 51: 483-491. Dec. 1953. [From authors' abstract in Public Health Engineering Abstracts 35(4).]

Study of effects of poison treatments on rat populations of heavily infested sewers of a London borough. Poisoning after prebaiting, at intervals of 6 months, reduced populations to less than 10%. Population levels were regained in 6 months. Direct poisoning with 1080 was as effective as a prebaiting treatment. Direct poisoning with zinc phosphide was relatively unsuccessful. Direct poisoning with 1080 followed by a prebaiting treatment reduced a population to about 3%. Rate of restoration of population from this 3% level was higher than observed before; invasion from the surface evidently played a part. No relationship could be established between the estimated sewer rat population densities within each district, and the known sites of surface infestation.

Crowcroft, Peter. (Ministry Agr., Surbiton, Surrey, Eng.) TERRITORIALITY IN WILD HOUSE MICE, MUS MUSCULUS L. J. Mamm. 36(2): 299-301, diagram. May 1955.

Mice kept in large pens divided up the area into defended territories. Social heirarchies did appear, but fighting tended to disperse the animals into spatially distinct breeding areas occupied by 1 male and 1 or 2 females. For some unexplained reason, 1 nest box housed 13 males and 19 females although other boxes were empty. Fighting in this box caused wandering and consequent territorial fights. One nest box was inhabited only by males of poor condition and low social status. Territorial behavior is described.

Ecke, Dean H. ROOF RAT POPULATIONS IN SOUTHWEST GEORGIA. US Pub. Health Serv., Pub. Health Monog. no. 27. iii + 20 p., illus. Apr. 1955. 20¢ from Superintendent of Documents.

Live trapping and marking in rural areas of Brooks, Thomas, and Grady counties from June 1951 through Jan. 1953 followed years of less intensive study by others. Roof rats lived chiefly in barns and food-storage buildings. No evidence was found that these rats lived away from buildings. Data are given on sex and age ratios, reproductive condition by size groups, growth rates, disappearance during trapping, survival, population estimates, and travels. All evidence suggested that roof rat populations in area declined from about 1946 to 1951. Proportion of young rats declined in this period. Data indicate that decline was result of increased mortality of young between late pregnancy and trappable age. 80% of rats disappeared during 6 months of trapping; males disappeared more rapidly than females. Computed mortality rates were lower than disappearance rates. Rats traveled very little. Movements of more than 100 yards between buildings were rare. Apparently rats occasionally were transported by accident for greater distances. Roof rats tended to move about more in premises where there were Norway rats than where there were none.

Kartman, Leo, and Richard P. Lonergan. (US Pub. Health Serv., San Francisco, Calif.) OBSERVATIONS ON RATS IN AN ENZOOTIC PLAGUE REGION OF HAWAII. Pub. Health Reps. 70(6): 585-593, map & graphs. June 1955.

Summary: "Observations are reported concerning wild rodents inhabiting areas within an enzootic plague region on the island of Hawaii. The rat species Rattus hawaiiensis, Rattus rattus subspecies, and Rattus norvegicus were captured alive, marked, released, and recaptured to gain some idea of their survival, movements, and interrelations. Results suggested that none of the rat species migrates extensively, that they constitute more or less sedentary populations, and that they appear to coexist in an environment which favors their close physical proximity. Thus, in the areas studied, there appears to be a continuous rodent population having characteristics favorable for the perpetuation of wild rodent plague."

MAMMALS--RATTUS AND MUS--Continued

Southwick, Charles H. (Dept. Zool., Ohio U., Athens.) THE POPULATION DYNAMICS OF CONFINED HOUSE MICE SUPPLIED WITH UNLIMITED FOOD. Ecol. 36(2): 212-225, illus. Apr. 1955.

Six populations of mice, each started with 4 pairs of wild-trapped mice, varied widely in population growth. The variations apparently were caused by differences in behavior and productivity of the mice; there was no noticeable effect owing to concentrated housing and feeding facilities compared to dispersed facilities. The major mechanism of population limitation was excessive litter mortality. One population became "crowded" at a density of one mouse per 10 sq. ft., whereas others were not "crowded" until they reached densities 10 times as great.--L. F. Stickel.

MAMMALS--SCIURIDS

Flyger, V. F. (Johns Hopkins School Hygiene, Balt., Md.) SQUIRREL SOCIOLOGY. Md. Cons. 32(3): 12-14, illus. May 1955.

Gray squirrels were studied near Baltimore in two 10-acre woodlots of mature trees. Each woods had about 50 squirrels, or 5 per acre, which is exceptionally high. Squirrels were marked with a purple fur dye and by clipping hair on tail. Observations revealed that males generally stayed within areas of 2 acres, females about 1.2 acres. Ranges overlapped widely. Six or more individuals were found to live in the same den tree. Signs of strife were seldom seen, despite the high populations. Thus there was little evidence of territoriality, which suggests that management might well build up high populations. Dominance hierarchies were noted at feeding stations. Adults dominated young, males usually dominated females of same age.

Grizzell, Roy A., Jr. (Ky. Woodlands Natl. Refuge, Golden Pond, Ky.) A STUDY OF THE SOUTHERN WOODCHUCK, MARMOTA MONAX MONAX. Am. Midl. Nat. 53(2): 257-293, illus. Apr. 1955.

Life history study made in central Md., 1947-49. Among the many topics discussed are live-trapping, handling, marking, longevity, hibernation, gestation, size of litters, weights, growth, sex ratios, populations, food habits, mortality factors, den construction, den use, values of woodchuck dens to other animals, diel and seasonal activities, and travels. Range has been extended into e. Md. within last 40 years. The animal is thought to be increasing in most of its range. Natural life span may be 5-6 years. Loss of weight in hibernation averaged 30%. Gestation was found to be about 32 days. Litter size averaged 4.6. Sex ratio was about 1:1. Average fall population of 2 study areas was 12 and 18 per 100 acres. Most important mortality factors were man and predators. Construction of dens and use of dens by woodchucks and other animals are considered at length.

King, John A. SOCIAL BEHAVIOR, SOCIAL ORGANIZATION, AND POPULATION DYNAMICS IN A BLACK-TAILED PRAIRIEDOG TOWN IN THE BLACK HILLS OF SOUTH DAKOTA. U. Mich., Contr. Lab. Vert. Biol. no. 67. 1-123 p., illus. + 4 plates. Apr. 1955.

A comprehensive social study based primarily on extended observations of marked animals. Attention was concentrated on environmental and social relationships in a 5-acre portion of a prairiedog town. The basic social and territorial unit was the coterie which contained an average of 8.5 individuals, but usually only one adult male. Its average size was 0.7 acre, and was used in its entirety by all its members. Social relationships within and between coteries are analysed in relation to population density and extension of occupied territory. See also WR 69: 20.--L. F. Stickel.

Kirby, Harold, and Bronislaw Honigberg. FLAGELLATES OF THE CAECUM OF GROUND SQUIRRELS. U. Calif. Pub. Zool. 53(9): 315-366, illus. 1949. $1.00.

MAMMALS--SCIURIDS--Continued

Lampio, Teppo. ORGANIZATION OF THE SQUIRREL HUNTING IN FINLAND. Suomen Riista 8: 114-119, illus. 1953.
In Finnish with English summary. Lampio has previously taken up the principles upon which the Finnish squirrel population is managed. Here he goes into questions of how the necessary data are gathered each year, and what the practical and scientific considerations are on which harvest regulations are based.

Mayer, William V., and Edward T. Roche. DEVELOPMENTAL PATTERNS IN THE BARROW GROUND SQUIRREL, SPERMOPHILUS UNDULATUS BARROWENSIS. Growth 18: 53-69, illus. 1954. [From J. Mamm. 36(2).]

Uhlig, Hans G. (Seneca St. Forest, Dunmore, W. Va.) WEIGHTS OF ADULT GRAY SQUIRRELS. J. Mamm. 36(2): 293-296. May 1955.
Tabulation of average weights of 4050 gray squirrels from various parts of W. Va. and of samples from various parts of e. U. S. On basis of these weights, general area of intergradation between S. c. carolinensis and S. c. leucotis is worked out.

Yerger, Ralph W. (Fla. St. U., Tallahassee.) LIFE HISTORY NOTES ON THE EASTERN CHIPMUNK, TAMIAS STRIATUS LYSTERI (RICHARDSON), IN CENTRAL NEW YORK. Am. Midl. Nat. 53(2): 312-323. Apr. 1955.
Breeding periods, dates of birth, size of litters, age at maturity, number of litters, age at leaving nest, courtship, sex ratio, survival over winter, foods, molt, hibernation, aestivation, age determination by teeth and bones, longevity.

MAMMALS--BEAVER

Freye, Hans-Albrecht. BEMERKUNGEN ZUM GENITALSYSTEM DES MÄNNLICHEN BIBERS, CASTOR FIBER L. Wissensch. Zeitsch. Martin-Luther-Universität Halle-Wittenberg, Jahrg. 2, Heft 11: 911-915, illus. 1953? [From J. Mamm. 36(2).]

Freye, Hans-Albrecht. BEITRÄGE ZUR FUNKTIONELLEN ANATOMIE DES BIBER-SKELLETTES. Wissensch. Zeitsch. Martin-Luther-Universität Halle-Wittenberg, Jahrg. 3, Heft 5: 1101-1135, illus. Aug. 1954. [From J. Mamm. 36(2).]

Kebbe, Chester E. (Ore. Game Comm.) HARVESTING BEAVERS BY PRIVATE TRAPPERS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 216-218. May 1954. [1955.]
Describes Oregon's experience with highly flexible regulations at a time when pelt prices were low and reduction of beaver populations was desired.

Wilson, Kenneth A. (N. C. Wildl. Resources Comm.) THE BEAVER IN NORTH CAROLINA. Wildl. in N. C. 19(5): 6-8, 10, illus. May 1955.
History and present status. Favorable and unfavorable effects of beaver are discussed. There are about 5,000 beavers in N. C. now, most of them in a 5-county area around the restoration site, Sandhills Wildlife Management Area. Trapping season was opened for first time in recent years in spring of 1955.

MAMMALS--MUSKRAT AND NUTRIA

Artimo, Atso. ON THE FLUCTUATION IN THE HARVEST OF THE MUSKRAT. Suomen Riista 8: 180-181, graphs. 1953.
In Finnish with English summary. Muskrats have been in Finland for only 30 years, but they have reached strong population peaks in 1937 and 1950. They may prove to have a 10-year periodicity there as they seem to have in Canada.

MAMMALS--MUSKRAT AND NUTRIA--Continued

Fuller, Jefferson C. (S. C. Wildl. Resources Dept.) FOUR-LEGGED WEED CUTTER. S. C. Wildl. 2(2): 5, 23, illus. Spring 1955.
Nutria have been introduced into at least 2 counties of S. C. for control of weeds in farm ponds. Legal protection for the animal is being sought. The author presents views of experts who know nutria in other states. Preferred foods in Mobile Bay, Ala., are listed. In control of weeds in ponds, nutria seem to have only a temporary, selective effect unless confined. Rice farmers complain of damage to levees. Cattlemen object to nutria because they reduce marsh vegetation so much that a good burn cannot be obtained. Some marshes are eaten out. Complaints about nutria are beginning to come from cane growers and sweet potato farmers. [Calif. is seeking to exterminate nutria in the wild. Furthermore, value of nutria as a fur animal is very much open to question at present. Introductions of this animal should be considered very carefully; they may produce more pest than profit.]

MAMMALS--FURBEARERS--GENERAL

Gale, Larry R. (Ky. Dept. Wildl. Resources.) FUR HARVEST IN KENTUCKY INCREASED BOTH IN TOTAL NUMBERS AND VALUE LAST SEASON. Ky. Happy Hunting Ground 9(6): 14, illus. Nov. 1953.
Reported fur catch and its value, by species, 1952-53.

Remington, Jack, compiler. (Colo. Game Dept.) FUR RESOURCES AND BEAR STUDIES. Colo. Game & Fish Dept., Final Rep. Invest. Proj. no. W-61-R. 1-85 p., mimeo., + plates. Apr. 1955.
Detailed, intradepartmental type of report on several different fur animal studies. Contains much useful information and suggestions as to how some studies could have been handled more effectively. Partial indication of content and findings follows. Data are given by species on size and value of recent fur harvests. Changes in seasons are recommended. Results of muskrat study are presented. Spring muskrat trapping is easier and more profitable than fall trapping but is inadvisable because there is heavy winter kill in high country, too many breeders are killed, and too many ducks are caught. Different seasons are needed for high and low country. Data are given on trapping, tagging, and travels of marten. Much information is given from ecological study of beaver areas. Beaver-occupied watershed produced more waterfowl and muskrats and far more browse than did check area. Beaver tagging and transplanting is discussed in detail; it was found that few beaver stayed where released, that many homed long distances to places where not wanted, and that transplanting as now practiced in Colo. is undesirable. Techniques of transplanting beaver by plane and parachute are described. Ranges of black and grizzly bears in state are mapped. Food habits of black bears are reported on basis of 48 samples. Numerous observations on habits of bears are reported. Relationship of bears to livestock is discussed at length, with many examples. Bears do kill stock, but many deaths are erroneously attributed to bears by stockmen. Consequently, stockmen are strongly hostile to bears. Better herding, use of good stock dogs, and elimination of killer bears by hunting with dogs are favored by author.

MAMMALS--BEARS

Childs, Thomas W., and Norman P. Worthington. BEAR DAMAGE TO YOUNG DOUGLAS-FIR. US Forest Serv., Pacific NW Forest & Range Exp. Sta. (Portland, Ore.), Res. Note no. 113. 1-4 p., illus. Apr. 1955.
Provides some new figures on this type of damage and demonstrates that it has been occurring for a long time, probably since time immemorial, certainly since 1854. The paper also gives data on long-term effect of such wounding on trees. "Serious damage to young Douglas-firs by bears appears to consist principally of killing by complete girdling. Where girdling is only partial, damage to the tree is usually slight."

MAMMALS--BEARS--Continued

Lindemann, Waldemar. ZUR RASSENFRAGE UND FORTPFLANZUNGSBIOLOGIE DES KARPATISCHEN BRAUNBÄREN, URSUS ARCTOS ARCTOS LINNÉ, 1758. Säugetierk. Mitteil. (Stuttgart) 2(1): 1-8. Jan. 1954. [From J. Mamm. 36(2).]

Schultz, Vincent. (Johns Hopkins School Hygiene, Balt. 5, Md.) STATUS OF THE BLACK BEAR IN TENNESSEE. Rep. Reelfoot Lake Biol. Sta. 19: 40-43. Jan. 1955. [Same as J. Tenn. Acad. Sci. 30(1).]

"It is apparent from these data that the primary Tennessee range of the black bear is the Unaka Range with the secondary being the Cumberland Plateau. Apparently the bear is fairly common in the Unaka Range and rare in the Cumberland Plateau. With proper protection in the latter region, the bear may again become an important constituent of the fauna of this region. It is difficult to ascertain whether or not the black bear is present in the bottoms of the Mississippi River and its tributaries but it is not in the realm of an impossibility." Based on state game survey; see WR 80: 4.

MAMMALS--RACCOON AND RINGTAIL

Edwards, Robert L. (Ardea, McClellanville, S. C.) OBSERVATIONS ON THE RING-TAILED CAT. J. Mamm. 36(2): 292-293. May 1955.

A captive taken in Texas when young escaped during 2 different winters, once in N. Y., once in Mass. It did surprisingly well, feeding largely on red squirrels and starlings in N. Y. In Mass. it survived an entire, hard winter in the wild. "It would probably be well to avoid the possibility of introduction."

MAMMALS--MUSTELIDS

Müller, Heinrich. ZUR FORTPFLANZUNGSBIOLOGIE DES HERMELINS (MUSTELA ERMINEA L.). Rev. Suisse Zool. 61(3): 451-453. Sept. 1954. [From J. Mamm. 36(2).]

Newby, Fletcher E., and Philip L. Wright. (Mont. Game Dept.) DISTRIBUTION AND STATUS OF THE WOLVERINE IN MONTANA. J. Mamm. 36(2): 248-253, map. May 1955.

Compilation of recent records suggests that wolverines are spreading and breeding in w. Mont. mountain regions. Present stock is thought to have come from Canada, and later from increase in Glacier Natl. Park. Some records suggest long travels through lowland habitat. Subspecific identification is discussed. "It seems reasonable to conclude...that the wolverine is not at present threatened with extinction but instead may be increasing its numbers and repopulating its range in Montana. However, intensive logging operations have made rapid inroads into many areas of excellent wolverine habitat in recent attempts to control depredations of the spruce bark beetle... If this situation continues our protected wilderness areas and National Parks will be the only areas remaining with suitable habitat for animals such as the wolverine, Canada lynx, marten and grizzly bear."

Stephens, Marie. OTTER RESEARCH. Oryx 2(5): 320-324. Aug. 1954. [From J. Mamm. 36(2).]

MAMMALS--DOGS, WOLVES, FOXES

Ciordia, H. (U. Tenn.) MESOCESTOIDES JONESI, N. SP., FROM THE GRAY FOX, WITH DESCRIPTIONS OF THE CHROMOSOME COMPLEMENT AND A DICEPHALIC SPECIMEN. Rep. Reelfoot Lake Biol. Sta. 19: 57-63, illus. Jan. 1955. [Same as J. Tenn. Acad. Sci. 30(1).]

MAMMALS--DOGS, WOLVES, FOXES--Continued

Dodds, Donald G. (Cornell U.) FOOD HABITS OF THE NEWFOUNDLAND RED FOX. J. Mamm. 36(2): 291. May 1955.
Report on contents of 43 summer and 7 winter scats. Red foxes are increasing rapidly in Newfoundland and prey animals are not plentiful. Major foods seem to be varying hare, birds, beetles, berries, and moose carrion.

Errington, Paul L. (Iowa St. Coll.) OUR LITTLE WILD DOGS--THE FOXES. Aud. Mag. 57(1): 14-17, 27, illus. Jan.-Feb. 1955.
Popular but significant presentation of Errington's knowledge of red fox habits, biology, population dynamics, and position as predator. The article brings together in easily read form the conclusions Errington has reached after decades of experience with foxes and predation problems.

Fuller, W. A., and N. S. Novakowski. WOLF CONTROL OPERATIONS, WOOD BUFFALO NATIONAL PARK, 1951-52. Can. Wildl. Serv., Wildl. Mgt. Bul., ser. 1, no. 11. ii + 23 p., illus. 1955.
Opportunity to get biological data was afforded by control work in winter of 1951-52. Cyanide guns and meat poisoned with strychnine were exposed in a portion of the park. Animals taken were 59 wolves, 39 foxes, 19 ravens, and 1 lynx. Control of wolves in area was estimated at 70%. Data are presented on weights, measurements, color, food habits, intestinal worms, breeding condition, and fatness. Limited data are given on habits, circuital travels, composition of packs, and heirarchies within packs. A very interesting finding was that adult wolves seemed to outnumber young by 4 to 1, which implies heavy mortality of young. This is especially odd since nearly all wolves examined were extremely fat, and hence no food crisis was evident. As to control methods, poisoned baits were found to be easier and safer to handle and more effective than cyanide guns, although less selective.

Hildebrand, Milton. COMPARATIVE MORPHOLOGY OF THE BODY SKELETON IN RECENT CANIDAE. U. Calif. Pub. Zool. 52(5): 399-470, illus. 1954. $1.00.

Lampio, Teppo. ON THE FOOD OF THE FOX. Suomen Riista 8: 156-164, illus. 1953.
In Finnish with English summary. Based on analyses of 325 stomachs from Finland, most of which were collected during hunting seasons, 1947-51. Foods are reported in considerable detail, with attention to seasonal changes, differences between foods of males and females, and between normal and Samson foxes. The latter have spread, especially in south and central Finland.

Schultz, Vincent. (Johns Hopkins School Hygiene, Balt. 5, Md.) STATUS OF THE COYOTE AND RELATED FORMS IN TENNESSEE. Rep. Reelfoot Lake Biol. Sta. 19: 44-46. Jan. 1955. [Same as J. Tenn. Acad. Sci. 30(1).]
"In summary it appears that the coyote is present in several localities in Tennessee and that the populations are currently stable. It is difficult to speculate correctly on the current status of wolves in the state as there exists a possibility that a limited number may still exist in some sections." Based on state game survey; see WR 80: 4.

Scott, Thomas G. (Ill. Nat. Hist. Surv., Urbana.) DIETARY PATTERNS OF RED AND GRAY FOXES. Ecol. 36(2): 366-367, illus. Apr. 1955.
Food habits data from tract analyses of 69 red foxes and 26 gray foxes collected in Iowa, Jan.-Mar., 1948. Plant remains were more numerous in gray foxes and mammal remains were somewhat more frequent in red foxes.--L. F. Stickel.

MAMMALS--DOGS, WOLVES, FOXES--Continued

Scott, Thomas G., and Willard D. Klimstra. (Ill. Nat. Hist. Surv.) RED FOXES AND A DECLINING PREY POPULATION. So. Ill. U., Monog. Ser. no. 1. iii + 123 p., maps & graphs. 1955. $2.00 (paper).

Trends in feeding of red foxes were studied for 3 years in southeastern Iowa. Trends in food animal populations were also studied in this period, during which prey populations underwent cyclic decline. It was found that both preferences and availability determined what was eaten. Microtus was preferred to Peromyscus; moles, shrews, and snakes were not preferred. Preferences became less apparent when prey populations were low. Annual, seasonal and other variations in availability were reflected in the diet. But fluctuations of prey populations were not proportionately reflected in the diet. Threshold of security of prey seemed to be affected not only by strength of protective cover but also by acceptability and availability of other food. Some foods served as buffers for vertebrate prey. Foxes did not seem able to control prey populations even when these populations were low. There was evidence that 2 fox pups starved to death when prey was scarce. Larger populations of prey probably could have been carried over if more protective winter cover closely associated with food had been available. Planting of fruits liked by foxes would cause less use of other foods while the fruits were available. Losses of chickens would be eliminated by practice of commonly recommended poultry husbandry methods. [For 2 companion papers by Scott see Ecol. Monog. 13: 427-479, 1943 (WR 39: 27), and Iowa Agr. Exp. Sta. Res. Bul. 353, 1947 (WR 54: 14).]

Siivonen, Lauri. RACCOON DOG, NYCTEREUTES PROCYONOIDES GRAY, THE NEWEST GAME SPECIES OF FINLAND. Suomen Riista 8: 177-179, map, illus. 1953.

In Finnish with English summary. It is interesting to learn that this odd and raccoon-like dog of eastern Asia was introduced into European Russia and has spread across Finland and into Sweden.

MAMMALS--CATS

Carter, T. Donald. (Am. Mus. Nat. Hist., N. Y.) REMARKABLE AGE ATTAINED BY A BOBCAT. J. Mamm. 36(2): 290. May 1955.

A male caught in the wild sired 3-4 litters in captivity and lived to age of more than 25 years.

Hock, Raymond J. (Arctic Health Res. Center, Anchorage, Alaska.) SOUTHWESTERN EXOTIC FELIDS. Am. Midl. Nat. 53(2): 324-328. Apr. 1955.

Review of distributional records and distributional problems for jaguar, ocelot, margay, and jaguarundi in U. S.

Progulske, Donald R. (U. Mo.) GAME ANIMALS UTILIZED AS FOOD BY THE BOBCAT IN THE SOUTHERN APPALACHIANS. J. Wildl. Mgt. 19(2): 249-253. Apr. 1955.

Food habits of the bobcat (Lynx rufus) in the southern Appalachian Mountain region (Va. and N. C.) were determined through the examination of 57 stomachs, 50 intestines, and 124 scats collected from Jan. 1951 to Apr. 1952. Twenty-six kinds of food items were identified. Game animals occurred in over 92% of the samples, non-game mammals and birds in nearly 42%, and other animals and grasses in less than 8%. It was concluded that cottontail rabbit and gray squirrel were the most important bobcat foods in this region. Deer apparently was taken more as carrion than as freshly killed prey.--D. R. Progulske.

Progulske, Don. HOW SERIOUS IS THE BOBCAT IN VIRGINIA? Va. Wildl. 16(5): 18-20, illus. May 1955.

Bobcats occur in parts of some forty-odd counties of Va. (map). They occupy about 11,000 square miles of range, and their average density is about 1 to every 4.5 miles of range. There are, therefore, about 2,500 bobcats in the state. Breeding starts early in Jan. and extends at least to late May. Litters of 5 may be born, but litters of 2 or 3 are more common. An average female weighs about 16.5 lbs. Males average 23 lbs. but a very large one weighed 40 lbs. Food habits are reported on basis of analysis of contents of 80 stomachs and 125 droppings from Va. and N. C., 1951-52. No game bird and few

MAMMALS--CATS--Continued

song bird remains were found. Common foods were rabbits, gray squirrel, and meadow mouse. Deer were a common food only after hunting season, when cripples and carrion were available. "...bobcats as a whole have little detrimental effect on our total game populations. They should be set free from the restrictions of the past by some means that would protect the bulk of the animals that do no harm, while providing ways to stop the occasional individual that does become destructive."

MAMMALS--BIG GAME--GENERAL

Anonymous. 1954 BIG GAME HARVEST. Ore. St. Game Comm. Bul. 10(6): 4-5, graphs. June 1955.
Deer and elk kills are tabulated by counties. Data are given on hunter success by county and by day of season. Total kill is estimated at 112,916 deer, 5,414 elk, and 334 pronghorns.

Hoskins, Leonard W., and Paul D. Dalke. (Nev. Game Comm.) WINTER BROWSE ON THE POCATELLO BIG GAME RANGE IN SOUTHEASTERN IDAHO. J. Wildl. Mgt. 19(2): 215-225. Apr. 1955.
Study of range types and their condition and of competition between big game (elk and deer) and cattle. The range generally is in good condition and competition between game and cattle is slight. "Bitterbrush and mountain mahogany are the two key plant species for deer management on the area. If only 60 per cent of the annual growth on these two plants is taken, no other plant species is likely to be over-utilized. However, the winter of 1951-52 has clearly demonstrated that over-use of these two plants is accompanied by over-use of the range vegetation in general. Direct competition exists between elk and deer for certain low browse species in the late fall. Elk and deer also compete directly for new growth of grasses and balsamroot in the spring. Under heavier use or with range depletion, competition between any two classes of animals could become serious... The deer herd is too large for moderately severe winters such as experienced in 1951-52."

Hunter, Gilbert N., and others. DEER-ELK-BEAR SEASONS IN COLORADO 1948-1953. Colo. Dept. Game & Fish. 1-64 p., illus. 1955?
This attractive bulletin is a mine of statistical information on its many topics: economic benefit to state of big game hunting, hunter time and expense, importance of nonresident hunters, license sales, regular and special seasons and their functions, methods of computing kill, kills by counties, kills by sex and age groups, hunting pressure and success, weights and antler characteristics of deer and elk. Deer and elk hunters spent an average of $11,686,912 per year in Colo. during the 6 years. The average nonresident deer hunter spent $265 and the elk hunter $347 as compared to $76 and $106 for residents. Some 21% of the state's deer hunting area has been open to taking of 2 deer. Preseasons have been one of the most effective management tools. The hunter report card system is considered satisfactory and accurate. Knowledge of hunting pressure per county has been useful in management. Hunter success has averaged 71.5% for deer and 30.8% for elk. Eight checking stations in state have proved enough for purposes intended. Nearly half the deer and elk killed pass through them. 99% of elk and 81% of deer are taken on federal lands. Bear kill during period varied from 823 to 322, depending largely on weather.

Lauckhart, J. Burton. (Wash. St. Game Dept.) ARE WE ADEQUATELY HARVESTING OUR BIG GAME? Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 75-77. May 1954. [1955.]
A 25% annual kill is about the maximum that can be expected in deer management. A 33% surviving increase is necessary to replace a 25% yearly harvest. There is still room for improvement in the either-sex harvest program, but in general the western states are doing a good job in harvesting big game. This is attributed largely to regulation by relatively small units of land. The system permits good distribution of kill and fitting of kill to local conditions. It is also excellent public relations. Future refinements of big game seasons undoubtedly will be toward greater complexity rather than simplicity.

MAMMALS--BIG GAME--GENERAL--Continued

McCulloch, Clay Y., Jr. (Ariz. Game Dept.) UTILIZATION OF WINTER BROWSE ON WILDERNESS BIG GAME RANGE. J. Wildl. Mgt. 19(2): 206-215. 1955.

Since 1910 there have been a decline in mule deer (Odocoileus h. hemionus), a great buildup of elk (Cervus c. canadensis) numbers, and destructive use of winter range in Idaho's upper Selway wilderness. Associated with these phenomena were vast forest fires, large areas of new shrub growth, restriction of legal hunting, decline of elk tooth and hide hunting, predator control, establishment of large game refuges, and natural inaccessibility for many hunters. Browse conditions were investigated during the severe winter of 1951-1952. Of the ten most abundant available shrub species, six were heavily used, and four were scarcely touched by big game. Reproduction of timber and desirable browse species are retarded. Despite a decrease in elk numbers since the mid-1930's, the winter range in its present condition is not adequate for the number of elk present at the time of this study.--Clay Y. McCulloch, Jr.

MAMMALS--HOOFED (Except deer)

Banfield, A. W. F. (Can. Wildl. Serv.) A PROVISIONAL LIFE TABLE FOR THE BARREN GROUND CARIBOU. Can. J. Zool. 33(3): 143-147, graph. June 1955.

Abstract: "A provisional life table for the continental Barren Ground caribou, Rangifer arcticus arcticus (Richardson), has been prepared from a collection of 292 mandibles collected in 1948 and 1949 on the summer and winter ranges of the species in northern Canada. The data include both sexes. The age of the specimens was estimated by the eruption and wear of the teeth. The mean expected life span at birth was found to be 4.09 years. The average mortality rate for the first 10 years of life was 71%. The apparent potential natural longevity was about 13 years."

Brown, Don L. (Mont. Game Dept.) CENSUS AND MANAGEMENT OF CENTRAL MONTANA ANTELOPE. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 211-215. May 1954. [1955.]

Findings on best way to census pronghorns from air. Conditions that must be met are discussed. Sample results are given for 2 area units.

Bush, Mildred, and C. A. Kofoid. CILIATES FROM THE SIERRA NEVADA BIGHORN, OVIS CANADENSIS SIERRAE GRINNELL. U. Calif. Pub. Zool. 53(6): 237-262, illus. 1948. 50¢.

Darling, F. Fraser. CARIBOU, REINDEER AND MOOSE IN ALASKA. Oryx 2(5): 280-285. Aug. 1954. [From J. Mamm. 36(2).]

Deming, O. V. (US F&WS, Desert Game Range, Las Vegas, Nev.) REARING BIGHORN LAMBS IN CAPTIVITY. Calif. Fish & Game 41(2): 131-143, illus. Apr. 1955.

Brings together much previously unpublished information of the author and others. Subjects discussed include: the enclosure, shelter, care of pregnant ewes, parturition, postnatal care of ewes, feeding lambs, supplemental and solid food, ailments and their treatment.

Dodge, Natt N. (Natl. Park Serv.) RUNNING WILD. Natl. Parks Mag. 25(104): 10-15, illus. Jan.-Mar. 1951.

Account of the severe damages wrought by feral burros in national parks of the Southwest and problems of control. Troubles with other feral animals are mentioned.

Klein, David R. A RECONNAISSANCE STUDY OF THE MOUNTAIN GOAT IN ALASKA. M. S. thesis, U. Alaska. x + 121 p., illus. 1953. [Copy in US Dept. Int. Library.]

Koskimies, Jukka. THE WINTER FOOD OF THE MOOSE [IN FINLAND]. Suomen Riista 8: 177. 1953.

In Finnish with English summary.

MAMMALS--HOOFED (Except deer)--Continued

Krog, Hildur, and Mildred Monson. NOTES ON THE METABOLISM OF A MOUNTAIN GOAT. Am. J. Physiol. 178(3): 515-516. Sept. 1954. [From J. Mamm. 36(2).]

Peterson, Randolph L. (Royal Ont. Mus. Zool., Toronto.) NORTH AMERICAN MOOSE. U. Toronto Press. xi + 280 p., illus. 1955. Price $12.50.
This book provides a wealth of information about habits and biology of moose and is of importance as a guide to moose management. Basically, it is a report of field studies in Ontario combined with an intensive review of literature on the species. There are 19 chapters, discussing such topics as distribution, life history, age determination, behavior, food habits, habitat studies, relationships with other animals, diseases, population studies, and management. Peterson speculates on primitive distribution and post-glacial dispersal of moose, using sub-specific characters and the paleontological records as evidence. Total population of North American moose appears to be between 190,000 and 350,000. Peterson evidently believes the upper figure to be more nearly correct. Favored foods include balsam, willow, aspen, birch and alder among shrubs, and pondweeds and pond lily among aquatic plants. Moose, like deer, are favored by early stages of forest succession. Fire and logging may both be helpful in influencing favorable succession. Management should consider both control of harvest and improvement of habitat.--Fred H. Dale.

Quay, W. B. (U. Mich.) HISTOLOGY AND CYTOCHEMISTRY OF SKIN GLAND AREAS IN THE CARIBOU, RANGIFER. J. Mamm. 36(2): 187-201, illus. May 1955.
Describes glands and their chemistry, discusses probable functions of these glands in relation to behavior of the animals, and suggests experiments to test these relationships.

Russo, John Philip. (Ariz. Game Comm.) HUNTING, A KEY TO RESEARCH STUDIES OF ARIZONA BIGHORN. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 195-200. May 1954. [1955.]
Gives information on 2 hunts, discusses findings on diseases, and summarizes data on sex and age ratios. The limited hunts that are being permitted are of great value in research and public relations.

Sherman, H. B. (U. Fla.) THE OCCURRENCE OF BISON IN FLORIDA. Quart. J. Fla. Acad. Sci. 17(4): 228-232, illus. Dec. 1954.
Evidence that bison did occur in Fla. within historic times.

Steinbacher, G. ZUR BIOLOGIE DES EUROPÄISCHEN WILDSCHWEINS, SUS SCROFA LINNÉ, 1758. Säugetierk. Mitteil. (Stuttgart) 2(3): 126. July 1954. [From J. Mamm. 36(2).]

Wilber, Charles G., and Theodore W. Gorski. (St. Louis U., Mo.) THE LIPIDS IN BISON BISON. J. Mamm. 36(2): 305-308. May 1955.
Quantitative data on fatty acids, phospholipid, cholesterol, and lipid ratios in various tissues of several bison in Alaska.

MAMMALS--DEER

Bischoff, Arthur I. (Calif. Dept. Game.) LIMITATIONS OF THE BONE MARROW TECHNIQUE IN DETERMINING MALNUTRITION IN DEER. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 205-210. May 1954. [1955.]
Conclusions: "1. Because of individual variations, it was found necessary to reduce the number of bone marrow color and consistency classes to two: white and nonwhite, solid and gelatinous. 2. It was found that the amount of fat present in the tibia marrow did not correspond to that of the femur. 3. The two color classes were not found in all age classes of deer. It was found that femur marrow generally is red in fawns and yearlings. 4. The two consistency classes were found in all deer age groups. 5. Consistency alone will indicate the relative amount of fat present in femur marrow. With a high degree of accuracy, a gelatinous bone marrow, regardless of its color is indicative of a poor deer resulting directly or indirectly from malnutrition. 6. No definite conclusion can be made from a solid marrow concerning deer condition. 7. Little is gained by using the combination of color and consistency of a bone marrow to determine deer condition."

MAMMALS--DEER--Continued

Bissell, Harold D., and Helen Strong. (Calif. Dept. Game.) THE CRUDE PROTEIN VARIATIONS IN THE BROWSE DIET OF CALIFORNIA DEER. Calif. Fish & Game 41(2): 145-155. Apr. 1955.

Monthly analyses for many browse species are reported. From summary: "Crude protein levels on a dry weight basis are highest in spring and summer, when plants are succulent and growing, and lowest in the fall and winter, when plants are dormant. Because of the high moisture content of plants during their growth (succulent) periods, the actual amount of crude protein (and other energy-containing material) per unit of material eaten may be lower than when plants are eaten during their dormant periods. The protein level values obtained in connection with stomach analysis data lead to the conclusion that throughout the year the deer have available on their ranges varying amounts of vegetation analyzing 7 percent or better in crude protein content."

Black, Hugh Clark. SALT USE BY MULE DEER IN THE DESCHUTES NATIONAL FOREST OF CENTRAL OREGON. M. S. thesis, Ore. St. Coll. xi + 143 p., illus. 1955.

Bromley, A. W. (N. Y. Cons. Dept.) THE 1954 DEER KILL IN NEW YORK. N. Y. St. Cons. 9(5): 34-35. Apr.-May 1955.

Kill is tabulated by counties and regions, 1951-54, for both antlered and antlerless deer. Correction has now been worked out for nonreporting hunters of each region, so total kills can be estimated closely. Calculated total for 1954 was 38,549.

Davis, Richard Bratton. THE FOOD HABITS OF WHITE-TAILED DEER ON THE CATTLE STOCKED, LIVEOAK-MESQUITE RANGES OF THE KING RANCH, AS DETERMINED BY ANALYSES OF DEER RUMEN CONTENTS. M. S. thesis, Texas A & M Coll. 97 p. 1951. [Copy in US Dept. Int. Library.]

See also WR 71: 30.

Dunkeson, R. L. (Mo. Cons. Comm.) OUR DEER HERD'S LITTLE DIVIDEND. Mo. Cons. 16(6): 4-6, illus. June 1955.

In Mo., young does commonly breed soon after they lose their spots--when about 5-6 months old. On the average, 1 out of 3 fawns successfully rears a fawn her first year. About 60% of yearling does produce twins. About 83% of adult does have twins. Some 3% have triplets. "Old barren does" have not been found; does of 7-8 years produce twins annually. On the whole, reproduction can bring a 60% increase in the herd each spring. "In the average herd of 100 does of all ages the adults will have about 75 fawns and the yearlings and fawns of the past year will produce a dividend of 44 more young. This adds up to an average production of 119 fawns per 100 doe deer." The high rate of reproduction is attributed to keeping the herd thinned out.

Jones, F. Wood, editor. (Roy. Coll. Surgeons, London, Eng.) A CONTRIBUTION TO THE HISTORY AND ANATOMY OF PÈRE DAVID'S DEER (ELAPHURUS DAVIDIANUS). Proc. Zool. Soc. London 121(2): 319-370, illus. + 6 plates. Aug. 1951.

Much information on history, morphology, and habits.

Julander, Odell. (US Forest Serv., Ogden, Utah.) ECOLOGY OF DEER-LIVESTOCK FOOTHILL RANGES IN UTAH. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 186-194. May 1954. [1955.]

Quantitative data are given on range conditions in 2 important types of vegetation. For the curlleaf mountain-mahogany type, comparisons are made of areas in good condition, overgrazed by deer, overgrazed by livestock, and overgrazed by both deer and cattle. For the juniper-sagebrush-bitterbrush type, comparisons are made of areas in good condition, overgrazed by sheep, and overgrazed by both deer and sheep. Effects of these land uses on soil erosion and vegetative succession are considered. Livestock and/or deer can cause serious damage to the range, but both are desirable in that they utilize different types of forage in large part. "The study points to the desirability of properly balancing deer and livestock numbers in accordance with the volume and character of available forage in order to maintain or restore the superior mixed browse-grass-forb type."

MAMMALS--DEER--Continued

Passmore, R. C., and R. L. Hepburn. A METHOD FOR APPRAISAL OF WINTER RANGE OF DEER. Ont. Dept. Lands & Forests, Res. Rep. no. 29. 1-7 p. + 2 form sheets. Jan. 1955.

Quantitative, statistical method that permits relatively rapid collection of data suitable for accurate comparisons. Numbers of stems of different species used, and degree of use, are tabulated for plots of 66 x 2 ft. Rate of sampling is 64 plots per square mile. Number of plots is varied as the square root of area (square miles) to be sampled. Plots are spaced five chains from center to center. The paper shows how resulting data are handled and discusses use of method.

Riney, Thane. (Wildl. Div., Wellington, N. Z.) EVALUATING CONDITION OF FREE-RANGING RED DEER (CERVUS ELAPHUS), WITH SPECIAL REFERENCE TO NEW ZEALAND. I: DESCRIPTION OF TECHNIQUES FOR DETERMINATION OF CONDITION OF RED DEER. II. APPLICATION OF CONDITION INDICES TO DEER ECOLOGY AND MANAGEMENT RESEARCH. New Zealand J. Sci. & Tech., Sec. B, 36: 429-463, illus. Mar. 1955.

Various indicators of body condition were studied quantitatively in large series of red deer. Best single index to full range of condition was weight of kidney fat/ weight of kidney. Other fat deposits also gave useful indications that were sometimes helpful in supplementing the kidney index. Significance of these indices in research and management is discussed. Two applications are described. One pertains to demonstrating localization of herds where nearby ranges were of unequal nutritive value. The other takes up (with graph) the seasonal trends of fat reserves within a population, with males, females, yearlings, and fawns being treated separately.

Robinette, W. Leslie, and Jay S. Gashwiler. (US F&WS, Salt Lake City, Utah.) ANTLERLESS MULE DEER BUCKS. J. Mamm. 36(2): 202-205, illus. May 1955.

Describes several examples. All or most of the individuals probably were fertile.

Robinette, W. Leslie, and C. M. Aldous. (US F&WS, Salt Lake City, Utah.) "PARROT MOUTH" IN ROCKY MOUNTAIN MULE DEER. J. Mamm. 36(2): 308-310. May 1955.

This genetically recessive condition in which the lower jaw is too short to permit a normal bite was found in 8 deer in Utah. The aberration did not seem to affect health or condition of deer. Measurements of jaws are given.

Schultz, Vincent. (Johns Hopkins School Hygiene, Balt. 5, Md.) STATUS OF THE WHITE-TAILED DEER IN TENNESSEE. Rep. Reelfoot Lake Biol. Sta. 19: 66-75, maps. Jan. 1955. [Same as J. Tenn. Acad. Sci. 30(1).]

Based on state game survey; see WR 80: 4. "In summary it might be stated that: (1) deer are distributed in general throughout the state with concentration areas being in the Mississippi bottoms, western Highland Rim, Cumberland Plateau and Unaka Range; (2) populations were at a low level in the state during the period 1900 to 1930; (3) restocking has apparently resulted in population increases in restocked areas; (4) the deer population is currently increasing in the state; and (5) the present deer is probably a mixture of Odocoileus v. borealis and Odocoileus v. virginianus with apparently pure stock of Odocoileus v. virginianus being in the lower Mississippi bottoms and western Highland Rim."

Shope, Richard E. (Rockefeller Inst. Med. Res., N. Y.) AN INFECTIOUS FIBROMA OF DEER. Proc. Soc. Exp. Biol. Med. 88(4): 533-535. Apr. 1955.

Growths of the type discussed have been recorded in deer from Wis., Va., Vt., N. J., and Calif. Summary: "A naturally-occurring fibroma of the skin of deer has been transmitted experimentally. The causative agent survives for at least 22 months in fibroma tissue stored in 50% glycerol-saline at 0°F and furthermore is filterable through Berkefeld N filters, properties characteristic of a virus. The experimentally produced deer fibroma has an incubation period of approximately 7 weeks and a very slow rate of growth."

MAMMALS--DEER--Continued

Smith, Arthur D. (Utah Game Dept.) STUDIES ON THE NUTRITIVE VALUE OF BROWSE PLANTS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 201-204. May 1954. [1955.]

Report on nutritional analyses and digestion studies with mule deer in Utah. "The data suggest that only sagebrush and curlleaf mahogany give reasonably high nutrient values as calculated by standard digestion procedures. The others [juniper, birchleaf mahogany, cliffrose, bitterbrush, chokecherry, and oak] were fair to poor in quality." Possible errors and difficulties are discussed.

Steen, M. O., Allen Brohn, and Dunbar Robb. (Mo. Cons. Comm.) A SURVEY OF BRUCELLOSIS IN WHITE-TAILED DEER IN MISSOURI. J. Wildl. Mgt. 19(2): 320-321. Apr. 1955.

Literature on brucellosis in big game animals is briefly reviewed. Tests of blood sera of 996 white-tailed deer from Mo. revealed none infected with brucellosis.--Allen Brohn.

MAMMALS--MARINE

Caldwell, David K. (U. Fla.) EVIDENCE OF HOME RANGE OF AN ATLANTIC BOTTLENOSE DOLPHIN. J. Mamm. 36(2): 304-305. May 1955.

Carrara, Italo Santiago. OBSERVACIONES SOBRE EL ESTADO ACTUAL DE LAS POBLACIONES DE PINNIPEDOS DE LA ARGENTINA. Univ. Nacional de Eva Peron. 1-17 p., illus. 1954.

Study of numbers, trends, and movements.

Fraser, F. C., and H. W. Parker. GUIDE FOR THE IDENTIFICATION AND REPORTING OF STRANDED WHALES, DOLPHINS, PORPOISES AND TURTLES ON THE BRITISH COASTS. 2d ed. Brit. Mus. (Nat. Hist.), London. viii + 42 p., illus. 1953. 2s. [From review by A. B. Grobman, Quart. Rev. Biol. 29(2).]

"It begins with a few pages of general information, followed by a key to the cetaceans known, or expected, along the British Coasts. Each of 24 species is then described and illustrated. A similar but shorter section treats five species of sea turtles. The publication is thoughtfully conceived and nicely executed. Although primarily designed for a layman...it is a very sound summary that should be informative to many biologists far from the coasts of the British Isles."

Gunter, Gordon, Carl L. Hubbs, and M. Allan Beal. (Inst. Marine Sci., U. Texas, Port Aransas, Texas.) RECORDS OF KOGIA BREVICEPS FROM TEXAS, WITH REMARKS ON MOVEMENTS AND DISTRIBUTION. J. Mamm. 36(2): 263-270, illus. May 1955.

King, Judith E. THE OTARIID SEALS OF THE PACIFIC COAST OF AMERICA. Bul. Brit. Mus. (Nat. Hist.), Zool. 2(10): 309-337, illus. + 2 plates. Nov. 1954. 8s.

Chiefly a taxonomic study of fur seals of Pacific Latin America. Distribution and status of these seals are discussed. All otariids of American Pacific Coast are diagnosed and a key to their skulls is supplied.

Lockley, R. M. THE SAGA OF THE GREY SEAL: INTRODUCING THE NATURAL HISTORY OF THE GREY SEAL OF THE NORTH ATLANTIC. Devin-Adair, N. Y. 149 p., illus. 1955. $4.00. [From Sci. News Letter, Apr. 23, 1955.]

"The adventurous story of a trip by tiny Irish-built curragh, or long canoe, to the secret breeding place of the seals."

Lund, Hjalmar Munthe-Kaas. THE WALRUS (ODOBAENUS ROSMARUS (L.)) OFF THE COAST OF NORWAY IN THE PAST AND AFTER THE YEAR 1900, TOGETHER WITH SOME OBSERVATIONS ON ITS MIGRATIONS AND "CRUISING SPEED." Astarte, Zool. Dept. Tromsø Mus., no. 8. p. 1-2, illus. July 1954. [From J. Mamm. 36(2).]

MAMMALS--MARINE--Continued

Rand, R. W. (U. of Cape Town, S. Africa.) REPRODUCTION IN THE FEMALE FUR SEAL, ARCTOCEPHALUS PUSILLUS (SCHREBER). Proc. Zool. Soc. London 124(4): 717-740, map & graphs. Feb. 1955.
Good account of reproductive biology; includes full description of histological changes during cycle. It was not found possible to age specimens by growth rings in teeth.

Uda, Michitaka. STUDIES OF THE RELATION BETWEEN THE WHALING GROUNDS AND THE HYDROGRAPHICAL CONDITIONS. (I). Sci. Rep. Whales Res. Inst. (Tokyo) no. 9. p. 179-187. June 1954. [From J. Mamm. 36(2).]

MAMMALS--OTHER GROUPS

Buchanan, G. Dale. (Rice Inst.) NINE-BANDED ARMADILLO--INVADER FROM THE SOUTH. Animal Kingdom 58(3): 82-88, illus. May-June 1955.
Popular but authoritative summary of information on natural history and geographic spread of the armadillo.

BIRDS--GENERAL

Alexander, W. B., and R. S. R. Fitter. AMERICAN LAND BIRDS IN WESTERN EUROPE. Brit. Birds 48(1): 1-14. Jan. 1955.
It is surprising how many American land birds have reached Britain and Europe, apparently under their own power. This paper provides a good compilation of records and discussion of the subject.

International Committee for Bird Preservation / British Section. ANNUAL REPORT FOR 1954. Internat. Comm. Bird Pres., Brit. Mus. (Nat. Hist.), Cromwell Road, London, S.W.7. 1-66 p., illus. [1955.] 2s. 6d.
Gives much information on activities of the committee and cooperating groups, including International Wildfowl Research Bureau and Conseil International de la Chasse. Oil pollution is discussed at length. Much legislative and other work on behalf of waterfowl is reported. Considerable support for more protection of birds of prey is evident. The new British law for bird protection is reviewed. Conservation problems with birds in other countries are considered and recommendations for their solution are made. This booklet will be of special interest to American workers in showing what the bird conservation problems are in other countries, and how vigorously they are being approached by a variety of interrelated organizations.

Odum, Eugene P., and Edward J. Kuenzler. (U. Ga.) MEASUREMENT OF TERRITORY AND HOME RANGE SIZE IN BIRDS. Auk 72(2): 128-137, graphs. Apr. 1955.
Known size of range of an individual tends to increase with successive observations, but tends to level off after numerous observations. At what point can observations be ceased and still yield useful comparative data? Authors' studies indicate that good point to stop is when curve of increase has leveled off well enough that each additional observation will produce less than 1% increase in area. This point can be reached with from 25 to 90 spot observations, which require 2 to 8 hours of field study. Using this method, range sizes of different species are compared. It is shown also that territory is actually smaller when nestlings are being fed than during nest building and incubation; this is adverse to the theory that primary function of territory is to provide adequate food supply for feeding young. Authors' data were analyzed in terms of activity radius (Dice and Clark; see WR 76: 28). Results are "interpreted to mean that territorial birds, in contrast to mice, are relatively fixed in their movements during a given phase of the nesting cycle. Therefore, the expression of territory size in terms of area and the use of the observation-area curve are justified."

BIRDS--GENERAL--Continued

Wolfson, Albert. (Northwestern U.) ORIGIN OF THE NORTH AMERICAN BIRD FAUNA: CRITIQUE AND REINTERPRETATION FROM THE STANDPOINT OF CONTINENTAL DRIFT. Am. Midl. Nat. 53(2): 353-380, maps. Apr. 1955.
The theory of continental drift is explained and used to explain the history and distribution of American birds. Mayr's impressive paper (Wilson Bul. 58: 3-41), based on the theory of permanence of continents, is criticised in several respects.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Benoit, J., and I. Assenmacher. ACTION DES FACTEURS EXTERNES ET PLUS PARTICULIÈREMENT DU FACTEUR LUMINEUX SUR L'ACTIVITÉ SEXUELLE DES OISEAUX. IIe Réunion Endocrin. 1953: 33-80. [From abstract by D. W. S. in Ibis 97(2).]
"A valuable account of recent work carried out by the authors and their collaborators on the role of light and other external factors on the sexual activity of the duck. In addition other recent work is reviewed more briefly. Particularly interesting are the series of experiments which have shown that 'deep light-receptors' in the head are involved as well as the retina. It appears that in the duck light can filter through in the region of the orbit and impinge on the rhinencephalon and hypothalamus, and so stimulate gonad-development independently of the eye and optic nerve. In the intact animal both methods operate simultaneously."

Blanchard, Barbara D., and Mary M. Erickson. THE CYCLE IN THE GAMBEL SPARROW. U. Calif. Pub. Zool. 47(11): 255-318, illus. 1949. $1.50.
Study of reproductive biology and behavior.

Dawson, William R. TEMPERATURE REGULATION AND WATER REQUIREMENTS OF THE BROWN AND ABERT TOWHEES, PIPILO FUSCUS AND PIPILO ABERTI. U. Calif. Pub. Zool. 59(4): 81-124, illus. 1954. 75¢.

Gibb, John. (Ed. Gray Inst., Oxford, Eng.) FEEDING RATES OF GREAT TITS. Brit. Birds 48(2): 49-58, illus. Feb. 1955.
Good data on frequency and periodicity of feeding young were obtained for Parus major by aid of electrical recording device at nestbox. The apparatus is described and illustrated and results of the study are reported.

Lehrman, Daniel S. (Rutgers U., Newark 2, N. J.) THE PHYSIOLOGICAL BASIS OF PARENTAL FEEDING BEHAVIOR IN THE RING DOVE (STREPTOPELIA RISORIA). Behavior (Leiden) 7(4): 241-286. 1955.
Conclusions: "Prolactin acts to elicit parental regurgitation-feeding primarily because it causes engorgement of the crop and suppression of sexual behavior, rather than through an effect on central nervous mechanisms specific for parental behavior. The engorgement of the crop makes it sensitive to emetic stimuli provided by movements of the squab's head against the parent's breast. In addition, this crop-engorgement acts as a drive stimulus through which the dove learns to respond to the sight and/or sound of the squab."

Lockie, J. D. (Ed. Gray Inst., Oxford, Eng.) THE BREEDING AND FEEDING OF JACKDAWS AND ROOKS WITH NOTES ON CARRION CROWS AND OTHER CORVIDAE. Ibis 97(2): 341-369, graphs. Apr. 1955.
Study of reproduction in relation to food supply. In both rook and jackdaw, survival of nestlings decreases as brood-size increases. Food shortage is important factor in this. Eggs of jackdaws and rooks hatch asynchronously; this is an adaptation to variable food supply--small young are soon eliminated when food is scarce, and brood is thus adjusted to food supply. Size of brood that effectively produces most young is same as average clutch size. Season of year when suitable food is most available is time when most young are in nests. The breeding season, however, varies little from year to year. Food supply is unlikely to be a major factor in initiating ovulation, for its season of abundance is variable.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION--Continued

Marshall, A. J. BOWER BIRDS / THEIR DISPLAYS AND BREEDING CYCLES--A PRELIMINARY STATEMENT. Oxford U. Press, London. x + 208 p. + 27 plates. 1954. 30s. [From review by L. H. Matthews, Nature, April 2, 1955.]
Describes what is known about each species of bower-bird and its habits and integrates life history data with information from histophysiological studies. The amazing bower-building and decorating "phenomena are probably expressions of innate behavior patterns that are annually brought into play by the secretion of sex hormones during the period of pre-nuptial testis modification, which begins at approximately the same time each year, except in birds that inhabit dry areas of spasmodic and uncertain rainfall... The display, which may continue for months, attracts and retains the female's interest, keeps off rivals, and helps synchronise the male and female reproductive processes until, when the environment becomes seasonally appropriate for nesting and the rearing of young, fertilization occurs and the female goes off to build her nest..." One chapter discusses the evolution of bower-building and other display in birds.

Marshall, Joe T., Jr. (U. Ariz.) HIBERNATION IN CAPTIVE GOATSUCKERS. Condor 57(3): 129-134, illus. May-June 1955.

Matthews, G. V. T. (U. Cambridge, Eng.) AN INVESTIGATION OF THE 'CHRONOMETER' FACTOR IN BIRD NAVIGATION. J. Exp. Biol. 32(1): 39-58, graphs. Mar. 1955.
Results of experiments reported here, taken with those produced previously, "strongly support the suggestion that a form of complete, bico-ordinate sun navigation is used by birds."

Pratt, J. G. (Duke U.) AN INVESTIGATION OF HOMING ABILITY IN PIGEONS WITHOUT PREVIOUS HOMING EXPERIENCE. J. Exp. Biol. 32(1): 70-83, graphs. Mar. 1955.
Untrained birds and birds that previously had been released at distances up to 10 miles were released at distances of 75 and 143 miles from their loft. Both groups homed equally well. Birds of both groups tended to disappear in the direction of their loft. Heredity seemed to be a factor in successful homing.

Pratt, J. G., and R. H. Thouless. (Duke U.) HOMING ORIENTATION IN PIGEONS IN RELATION TO OPPORTUNITY TO OBSERVE THE SUN BEFORE RELEASE. J. Exp. Biol. 32(1): 140-157, map and graphs. Mar. 1955.
"Our results strongly suggest that there is no difference between the orientation of pigeons that have and pigeons that have not seen the sun before release. This conclusion is, however, tentative until it is confirmed by further experiments using a larger number of release points."

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Batts, Henry Lewis, Jr. AN ECOLOGICAL STUDY OF THE BIRDS OF A 64-ACRE TRACT IN SOUTHERN MICHIGAN. Ph.D. thesis, U. Mich. 175 p. 1955. [From long abstract in Dissertation Abstracts 15(4).]
"This study was made...to determine populations and habitat relations of birds found on the area during different seasons of the year, chiefly in respect to nesting sites, protection, food, and other vertebrate animals."

Kennedy, P. G., Robert F. Rutledge, and others. THE BIRDS OF IRELAND; AN ACCOUNT OF THE DISTRIBUTION, MIGRATIONS AND HABITS AS OBSERVED IN IRELAND. Oliver & Boyd (Edinburgh, Scotland). 437 p., illus. 1954. 42s. [From review by Monica de la Salle, Aud. Mag. 57(3).]
"As its main objective is to account for local distribution and migration--no descriptions are given--there is a particular interest in noting the changes in status, the gains and losses of species which have occurred in half a century. While, for example, the golden eagle, the white-tailed eagle, and the

BIRDS--MANUALS, FAUNAS, COMMUNITIES--Continued

yellow wagtail have disappeared as breeding species, there have been some spectacular compensations. The common scoter, the eider, the fulmar, and the red-necked phalarope have reared young regularly, and many other species have bred for the first time. Such changes, and other variations in distribution, demonstrate strikingly how deforestation, drainage, and replanting with conifers, while altering the face of the country and modifying the habitats, also affect wildlife populations."

Palmer, Ralph S., editor. (N. Y. St. Mus., Albany.) HANDBOOK OF NORTH AMERICAN BIRDS. OUTLINE FOR COLLABORATING AUTHORS; SAMPLE PAGES. Privately printed, Albany, N. Y. 59 p., illus. May 23, 1955.

An outline to set standards and for the guidance of authors collaborating in preparation of a comprehensive work on birds of America north of Mexico. After some general considerations, the following topics are outlined in detail: larger taxonomic categories, description, field identification, voice, habitat, distribution, migration, banding status, reproduction, survival, habits, food, and subspecies. Definitions are provided where needed, some in text, others by illustration. The outline contains quite a lot of material that is new, such as the approach to color terminology, definitions of forms of pair-bond, etc. The sample pages, in which the outline is followed, include at least one treatment of each of the above topics, written by an authority. Examples: the family Turdidae (W. C. Dilger), description of Sparrow Hawk (K. C. Parkes), distribution of Kittiwake, map and text (E. M. Reilly, Jr.), migration of Blue Goose (F. G. Cooch), food of Red-breasted Merganser (A. W. Schorger). This outline has been mailed to collaborators, some potential collaborators, and a few scientific libraries. A few copies are available to other interested persons on request.--R. S. Palmer.

Robertson, William Beckwith, Jr. AN ANALYSIS OF THE BREEDING-BIRD POPULATIONS OF TROPICAL FLORIDA IN RELATION TO THE VEGETATION. Ph.D. thesis, U. Ill. 613 p. 1955. [From long abstract in Dissertation Abstracts 15(5).]

Plant ecology and avian populations of s. Fla. were studied thoroughly in respect to geological history, weather, drainage, salinity, fire, lumbering, succession, and other factors. Much information is given about specific stands of vegetation and factors that determined their condition. "It is emphasized that present mosaic occurrence of vegetation types represents a natural equilibrium between successional tendencies and an environment including recurring fires and hurricanes. The importance of long-term successions uniting lowland and upland types through site elevation by peat deposits is questioned. There is no evidence that a uniform climax plant cover has existed in the region." The author believes that at the height of the last glaciation the Florida Bay region was much higher and drier than it is today; subsequent tendencies have been toward wetter, more saline conditions. S. Fla. land habitats are of W. Indian character but have an impoverished land-bird fauna, 85% of which consists of wide-ranging N. Am. species. It is hypothesized that the N. Am. species are retreating in the face of adverse climatic changes and that advent of W. Indian species is being retarded by water barriers.

BIRDS--NUMBERS AND NUMBER FLUCTUATIONS

Bond, Gorman M., ed. EIGHTEENTH BREEDING-BIRD CENSUS. Aud. Field Notes 8(6): 363-384. Dec. 1954.

Forty quantitative reports on breeding bird populations of study areas scattered from tundra to tropics.

Skutch, Alexander F. (San Isidro del General, Costa Rica.) HOW BIRDS HANDLE THEIR POPULATION PROBLEM. Animal Kingdom 58(3): 72-77, illus. May-June 1955.

"To conclude, birds avoid excessive increase in numbers in two distinct ways. Many of the longer-lived species delay breeding for one or more years after they have attained adult stature. Many tropical species lay only two or three eggs in a set although they seem capable of giving adequate care to larger families; and they do not compensate for these small broods by raising a larger number of them each year." Examples cited are from many parts of world, especially tropical America.

BIRDS--CONTROL, MORTALITY

Anonymous. LINDANE SAVES SEEDS. Ore. St. Game Comm. Bul. 10(4): 6-7, illus. Apr. 1955.
Experiments in Ore. demonstrated that lindane treatment of seeds protected plantings from pheasant damage in large part. Laboratory toxicity tests showed field poisoning of pheasants to be unlikely.--L. F. Stickel.

Frings, Hubert, Joseph Jumber, and Mable Frings. (Pa. St. U.) STUDIES ON THE REPELLENT PROPERTIES OF THE DISTRESS CALL OF THE EUROPEAN STARLING, (STURNUS VULGARIS). Pa. St. U., Occ. Papers Dept. Zool. & Ent. no. 55-1. 1-22 p., mimeo. May 1955.
Chief report on the subject. Detailed accounts are given of experimental use of recorded starling distress cry against roosting birds in 10 locations during 1953 and 1954 and of results obtained. "As a whole, these results seem promising." But, "No one should expect to clear starlings from objectionable roosts without intelligent and persistent work."

Hiltunen, Eero. ON ELECTRIC AND TELEPHONE WIRE ACCIDENTS IN BIRDS. Suomen Riista 8: 70-76, graph. 1953.
In Finnish with English summary. Discussion of such accidents in Finnish tetraonids, and factors affecting them. These accidents often occur when visibility is poor and birds are fleeing from enemies. Large birds have more trouble avoiding wires than do smaller birds. Several wires on a pole are harder to avoid than 1 wire.

Kerswill, C. J. (Fisheries Research Bd. of Canada.) RECENT DEVELOPMENTS IN ATLANTIC SALMON RESEARCH. Atlantic Salmon J. 4(1): 26-30, map & graphs. [Reprint p. 1-10.] Jan. 1955.
Includes data on effect of fish-eating birds and on effect of DDT. [The DDT data, as presented by Wildl. Mgt. Inst., is on p. 7 of this issue of WR.] One experiment in N. B. "showed that removal of mergansers and kingfishers raised by eight times the smolt production from hatchery plantings." When mergansers were controlled on the Miramichi River, N. B., the small parr increased from an average density of 8 per 100 sq. yards in 1950 to 24 in 1953. On the Dungarvon River, where mergansers were not removed, the small parr of 6 areas averaged 13 per 100 sq. yards in both 1952 and 1953. Differences in populations of fingerlings and large parr corresponded to those for small parr.

Tanner, James T., and others. (U. Tenn.) BIRD MORTALITY DURING NIGHT MIGRATION OCTOBER 1954. Migrant 25(4): 57-68. Dec. 1954.
"On the nights of Oct. 5-6, 6-7, and 7-8, 1954, a tremendous number of migrating birds were killed at a minimum of 27 localities scattered thru-out the eastern and southeastern states. The accidents occurred around airport ceilometers, brightly lighted areas, and at television and radio towers. ...never to our knowledge has there been such a widespread series of accidents on three successive nights... There is presented here a general summary of these events followed by more detailed accounts of the accidents that happened in Tennessee." A cold front with overcast caused migrants to fly low and thus set the stage for accidents. This is the usual cause. Such conditions can be foreseen and precautions can be taken with ceilometers and other attractions.

BIRDS--PARASITES AND DISEASES

Tiffany, Lois H., J. C. Gilman, and D. R. Murphy. (Iowa Agr. Exp. Sta., Ames.) FUNGI FROM BIRDS ASSOCIATED WITH WILTED OAKS IN IOWA. Iowa St. Coll. J. Sci. 29(4): 659-706, illus. May 1955.
Monograph on fungi cultured from beaks and throats of 8 species of small birds. A total of 334 birds was studied. The many kinds of fungi isolated are keyed, described, and illustrated. Oak wilt fungus was not found.

BIRDS--QUAIL

Boehnke, Roger Harvey. WINTER MOVEMENTS AND COVEY COMPOSITION OF THE EASTERN BOB-WHITE, DECATUR COUNTY, IOWA, 1952-1954. M. S. thesis, Iowa St. Coll. ii + 51 p., illus. 1954.
See WR 80: 31.

Gullion, Gordon W. (Nev. Game Comm.) MANAGEMENT OF NEVADA'S GAMBEL QUAIL RESOURCE. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 234-239. May 1954. [1955.]
Legal kills, distribution in state, populations, habitat, population fluctuations and their causes, census methods, hunting pressure and its effects (slight), habitat improvement by guzzlers and other means. For factual abstract of similar paper by author see WR 77: 43.

Harvey, Julian Carlyle. METHODS OF PREDICTING QUAIL POPULATION CHANGES. M. S. thesis, Va. Polytechnic Inst. ii + 49 p. 1953.

Haugen, Arnold O., and Frank W. Fitch. (Ala. Polytechnic Inst.) SEASONAL AVAILABILITY OF CERTAIN BUSH LESPEDEZA AND PARTRIDGE PEA SEED AS DETERMINED FROM GROUND SAMPLES. J. Wildl. Mgt. 19(2): 297-301. Apr. 1955.
A new technique for determining seed availability on the ground is described. Bicolor lespedeza was found to provide a sort of "ever normal granary" for quail, guaranteeing a food supply during all months of the year. Availability of Lespedeza thunbergii and L. cyrtobotrya was below that for bicolor. Partridge peas (Chaemaecrista fasciculata) were found to have the advantage of quick production and successful growth on poor soils. They lacked, however, some of the dependability shown by bicolor. Information suggests the possibility of using both bicolor and partridge peas in developments which require quick results. In order to conserve the carry-over of seed it is important that annual disking be avoided in order not to destroy the "bank account" of seed accumulated on the ground. The number of seed per pound for the species studied is listed.--Authors' abstract.

McMillan, Ian I. (Shandon, Calif.) AN OBSERVATION OF FLIGHT EXHAUSTION IN CALIFORNIA QUAIL. Condor 57(3): 188. May-June 1955.

Michael, Victor C., and Stephen L. Beckwith. (U. Fla.) QUAIL PREFERENCE FOR SEED OF FARM CROPS. J. Wildl. Mgt. 19(2): 281-296. Apr. 1955.
Feeding tests with 88 penned bobwhite gave primary consideration to rating preferences of these birds when simultaneously offered 53 food items, including seed of 51 crop and pasture plants. Quail generally preferred seeds of grasses to those of legumes, and seeds of annual grasses to those of perennial grasses. Recognized quail foods such as partridge pea, common (striata) lespedeza, and Florida beggarweed all placed relatively low. Preferences were almost identical whether position of seeds was constant or varied. Habit was of minor importance in influencing preferences. Smell and taste were shown to be of possible major importance in this respect. Harvester ants have food preferences that closely parallel those of bobwhite. As few as one colony of these ants per acre can consume as much as a covey of 8 or 10 quail, and could partially account for a shortage of preferred quail foods. Preferred foods of cotton rats and other native rodents were among those of low preference to quail, but since these mammals also readily accept some of the better quail foods, they compete directly with quail. When quail were fed diets of unlimited amounts of one kind of seed for a long time, symptoms characteristic of vitamin A deficiency usually developed within 20 days; substituting another kind of seed, or adding one or two kinds of seed to the diets, failed to alleviate these conditions. Females were over twice as susceptible as males to mortality from inadequate diets.--Stephen L. Beckwith.

Rosene, Walter, Jr. (US F&WS, Gadsden, Ala.) FIRE AND GAME MANAGEMENT. S. C. Wildl. 2(2): 4, 21-22, illus. Spring 1955.
Detailed account of effects on quail populations of fire used under various circumstances on southeastern quail preserves. For abstract see WR 79: 41.

BIRDS--QUAIL--Continued

Yadon, Vernal Lee. ECOLOGICAL ASPECTS OF THE VALLEY QUAIL IN THE MADRAS AREA OF CENTRAL OREGON. M. S. thesis, Ore. St. Coll. 9 + 140 p., illus. 1954.

BIRDS--PHEASANTS

Hart, Chester M. (Calif. Dept. Game.) PHEASANT HUNTING PRESSURES IN CALIFORNIA. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 219-226. May 1954. [1955.]

Extent of Calif. pheasant range, number of hunters, pressures on cooperative hunting areas and private hunting areas, seasonal distribution of pressure, source of hunters, results of studies of kills of wild and game-farm birds. No indication of overharvesting has been found. It seems impossible to overharvest pheasants when habitat is good, only cocks are shot, and season is of reasonable length. Of game-farm birds stocked during season, about 90% are shot within 3-4 days, if 20% crippling loss is included. Of birds stocked just before season, known take has averaged about 56%. Stocking done in June gives about 12% return, and earlier stocking gives almost no return. Seasonal pressures of 100-300 gun hours per 100 acres have given kills of 73-86% of wild cocks, including cripples; note here that 300% range in pressure had little effect on total kill. Figures are given to show that different hunting pressures cause very different age ratios in bag. Heavy pressure, quickly applied, seems to cause kill of all age classes in pretty much their true proportions. With lower pressure, the wily adult cocks tend to evade hunters and percentage of young in bag is much higher. Hence, workers should be cautious in interpreting age ratios of bagged pheasants.

Kabat, Cyril, F. M. Kozlik, D. R. Thompson, and F. H. Wagner. EVALUATION OF STOCKING BREEDER HEN AND IMMATURE COCK PHEASANTS ON WISCONSIN PUBLIC HUNTING GROUNDS. Wis. Cons. Dept., Tech. Wildl. Bul. no. 11. 1-58 p., illus. 1955.

Results of Wisconsin's huge pheasant stocking program were studied over a 14-year period. Emphasis was on public shooting grounds, where habitat was favorable and gun pressure was high. About 1/3 of hens released in spring had broods the same year. Their broods averaged 7.1 as compared to 8.2 for wild hens. But about 2/3 of released hens disappeared. The end result was that it took 2 released hens to add less than 1 cock to the fall population. Of cocks released in summer before hunting season, 51% were shot. Extremely thorough bag checks were necessary to reveal so high a recovery. Returns from cocks released in spring were low, about 3 to 18%. Rate of returns rose from spring releases to early fall releases but declined for releases made during hunting season, owing to reduced hunting pressure in latter part of season. From a cost basis, it seems best to stock shortly before hunting. The most economical stocking practice seems to be to release cocks of 10-12 weeks in late summer. Release of adults of either sex in spring is far too expensive and ineffective to be justifiable. Value of stocking young hens in late summer is still unknown. Statewide, about 90% of the annual kill is of wild birds, with artificially propagated cocks probably contributing about 10%. Habitat condition is vital, especially since wild pheasants make up 90% of bag. The state is spending large sums on habitat work, but habitat still is deteriorating rapidly. Under no circumstances can stocking be a substitute for habitat management.

Klonglan, Eugene DaWayne. FACTORS INFLUENCING THE FALL ROADSIDE CENSUS OF THE RING-NECKED PHEASANT (PHASIANUS COLCHICUS LINNAEUS) IN WINNEBAGO COUNTY, IOWA, 1952. M. S. thesis, Iowa St. Coll. iii + 103 p., illus. 1953. [Copy in US Dept. Int. Library.]

BIRDS--PHEASANTS--Continued

Klonglan, Eugene D. (Ia. St. Coll.) FACTORS INFLUENCING THE FALL ROADSIDE PHEASANT CENSUS IN IOWA. J. Wildl. Mgt. 19(2): 254-262, graphs. Apr. 1955.
Multiple linear regression analysis was made of the relationship of dewfall, wind velocity, relative humidity, cloudiness, temperature, and rate of pressure change to the number of pheasants observed per mile on each of two 30-mile roadside routes. The R value was 0.969 on Route 1 and 0.930 on Route 2. A simple linear regression of pheasants per mile on dewfall was nearly as good as the multiple regression for purposes of making adjustments in the roadside counts. The time of day was found to have a significant effect on the pheasants observed. There was less variation in counts made in Aug. than those in Sept. or Oct.--E. L. Kozicky.

Nelson, Maynard M. (Minn. Div. Game.) DEATH STALKS THE HAYFIELDS. Cons. Volunteer 18(104): 7-10, illus. Mar.-Apr. 1955.
It was estimated from work in 1954 that some 2,240 hen pheasants were killed during first hay mowing in Martin Co. and some 2,600 in Jackson Co., Minn. This meant loss of about 13,440 and 15,680 young. The estimated loss of young was nearly twice as great as hunter bag of cocks in same areas. What can be done? Let odd areas on farm grow up to natural cover. Leave field margins uncut at first mowing, for most pheasants nest in outer 50-75 feet of field. Use flushing bars. One Minn. test indicated that these bars reduced mortality by 60% but another test indicated very little benefit. These tests were limited, however, and other states have had good success with the bars.

Phillips, Richard Edward. SURVIVAL OF GAME FARM JUVENILE RING-NECKED PHEASANTS ON ELIZA ISLAND, WASHINGTON. M. S. thesis, Ore. St. Coll. 8 + 57 p. 1954.

BIRDS--GROUSE, PARTRIDGE, ETC.

Bendell, J. F. (Queen's U., Kingston, Ont.) DISEASE AS A CONTROL OF A POPULATION OF BLUE GROUSE, DENDRAGAPUS OBSCURUS FULIGINOSUS (RIDGWAY). Can. J. Zool. 33(3): 195-223, graphs. June 1955.
Abstract: "A population of blue grouse was studied on its summer range at Quinsam Lake, Vancouver Island, to determine the factors of importance in population control. The population is stable with a density of 0.40 adult males and 0.78 yearling and adult females to the acre. A life table is constructed on the basis of a stable population, the death of 80% of the chicks in the first three months after hatch, and the death of 31% of the adults each year, as calculated from banding returns. The survivorship curve is negatively "J"-shaped. Mortality rates appear constant and independent of age after the first year of life. Space, weather, food, predators, and disease are considered as factors capable of population control. Six parasites are new records in this host. Two of the six, Plagiorhynchus formosus and Dispharynx nasuta occur commonly and almost exclusively in the chicks, where they cause extreme damage to the tissues of the gut. It is concluded that parasitism by these helminths is an important mortality factor in the chicks and a major cause of population stability--an equilibrium between death in the older age classes and replacement by surviving young."

Buss, Irven O., and Eugene S. Dziedzic. (St. Coll. Wash.) RELATION OF CULTIVATION TO THE DISAPPEARANCE OF THE COLUMBIAN SHARP-TAILED GROUSE FROM SOUTHEASTERN WASHINGTON. Condor 57(3): 185-187, graph. May-June 1955.
Sharp-tails declined from abundance to great rarity in Adams, Spokane, and Whitman counties as most of the land was cultivated and intensified agricultural practices were introduced. A great part of the decline came in the decade 1910-20. At present, sharp-tails can be hunted legally in Wash. only in 3 northcentral counties.

Eng, Robert L. (Mont. Dept. Game.) USE OF AERIAL COVERAGE IN SAGE GROUSE STRUTTING GROUND COUNTS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 231-233. May 1954. [1955.]

BIRDS--GROUSE, PARTRIDGE, ETC.--Continued

Eng, Robert L. (Mont. Game Dept.) A METHOD FOR OBTAINING SAGE GROUSE AGE AND SEX RATIOS FROM WINGS. J. Wildl. Mgt. 19(2): 267-272, illus. Apr. 1955.
247 sage grouse wings from birds of known sex and/or age were used in establishing aging and sexing criteria. Depending on molt stage, age determination is based on condition of primaries 1 and 2 or difference in length between primaries 2 and 3. Sex determination is based on length of individual primaries.--Robert L. Eng.

Koskimies, Jukka. THE 1952 KILL OF CAPERCAILLIE AND BLACKGAME IN THE LIGHT OF WING SAMPLES. Suomen Riista 8: 30-35, illus. 1953.
In Finnish with English summary. Tells how to determine age of these birds by outer primaries and reports age and sex ratios for Finland, 1952.

Lee, Levon. (N. M. Dept. Game.) PRELIMINARY OBSERVATIONS ON THE TURKISH CHUKAR IN NEW MEXICO. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 227-230. May 1954. [1955.]
Habitats, predation, distribution of released birds, reproduction in captivity. A wild brood has been seen, but establishment of the species in N. M. is still uncertain.

McLean, Donald D. (Calif. Dept. Game.) THE CHUKAR PARTRIDGE IN CALIFORNIA. Proc. 34th An Conf. West. Assn. St. Game & Fish Comms. p. 240-243. May 1954. [1955.]
History in state, effect of habitat conditions on distribution and reproduction, list of foods eaten, distance traveled from water, observations on other behavior.

Sandfort, Wayne W. (Colo. Dept. Game.) EVALUATION OF CHUKAR PARTRIDGE RANGE IN COLORADO. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 244-250. May 1954. [1955.]
Presents an analysis of what constitutes good chukar country in Colo. and discusses a system by which prospective chukar range may be rated as to suitability.

Shelford, V. E., and R. E. Yeatter. (U. Ill.) SOME SUGGESTED RELATIONS OF PRAIRIE CHICKEN ABUNDANCE TO PHYSICAL FACTORS, ESPECIALLY RAINFALL AND SOLAR RADIATION. J. Wildl. Mgt. 19(2): 233-242, graphs. Apr. 1955.
Use is made of the principle of paired factors which largely control the response of an organism in critical physiological periods. The responses to the various combinations of conditions fall on concentric elliptical lines with optimum in the center. Sunshine and rainfall in the month of April in Ill. largely control the production of offspring. June rainfall and temperature apparently play an important role in survival of chicks. Ratio of young to adults in late July made possible the estimation of autumn population. The population data on the lesser prairie chicken suggests relations of fecundity to ultraviolet light.--Authors' abstract.

Siivonen, Lauri. CAN THE ABUNDANCE OF TETRAONIDS IN THE FALL BE FORECAST? Suomen Riista 8: 42-45, graph. 1953.
In Finnish with English summary. "The article reviews the observations on the breeding of tetraonids collected in 1946-52 through the summer inquiries of the Finnish Game Foundation (Siivonen 1952). The author shows that the abundance of tetraonids in the fall cannot as yet be estimated before the survival of the broods during the summer (July) is known."

Siivonen, Lauri. ON THE DESTRUCTION OF NESTS OF GALLINACEOUS BIRDS. Suomen Riista 8: 46-48, illus. 1953.
In Finnish with English summary. Observations were gathered on 1,247 nests in Finland, 1946-52. "The following percentages of nests of the different species were destroyed before hatching: capercaillie 16, blackgame 13, willow ptarmigan 8, hazel grouse 6 and European partridge 31." Direct and indirect influence of man was chief cause of destruction, especially for agricultural species. Predators, in order of importance, were fox, goshawk, corvid birds, cat, dog, badger.

BIRDS--GROUSE, PARTRIDGE, ETC.--Continued

Siivonen, Lauri. VARIATION IN THE HATCHING TIME OF THE EGGS OF GALLINACEOUS BIRDS. Suomen Riista 8: 147-150, graphs. 1953.
In Finnish with English summary. Dates of hatching of Finnish tetraonids, 1946-52, and weather factors that caused variation. Time of hatching in capercaillie seems to be determined by warmth of March and April. A cold spell in May seems to cause partial delay in hatching until end of June. "This is probably due to the fact that the start of egg-laying in the late birds has been postponed, owing to the continuance of cold weather, partly also to the later replacement of eggs destroyed at the egg-laying stage by the cold weather ('post-winter'). This opinion seems to be supported by the unusually common occurrence of small broods (3-5 eggs) after June 20 in such years."

WESTERN STATES CHUKAR COMMITTEE QUARTERLY REPORT 2(1). Dec. 1954-Feb. 1955. (G. C. Christensen, Box 9460, Univ. Station, Reno, Nev.)
A 9/16-inch-thick processed volume that contains numerous separately paged reports, many of which are PR job completion reports, from 12 cooperating states. In nature, most papers are progress reports. They provide data on a wide range of topics, including habitat, habits, dispersion, survival, study of newly introduced Turkish chukars, foods, predation, reproduction, and best season for release.

BIRDS--TURKEY

Beck, John R. and Doris O. (U. Tenn., Martin.) A METHOD FOR NUTRITIONAL EVALUATION OF WILDLIFE FOODS. J. Wildl. Mgt. 19(2): 198-205. Apr. 1955.
Chemical analysis of numerous foods actually taken from crops of wild turkeys on King Ranch, s. Texas. Composition of diet is compared with that required by turkeys at different seasons. Samples were collected in 1950-51, a drouth year. Phosphorus was somewhat low in foods, as it was in local soils. Energy content was below maintenance standards, and most turkeys had little or no fat. Nevertheless, it seems likely that wild turkeys of the area can do well on natural foods except in years of extreme drouth. "The use of this method of food habits analysis has many possibilities for practical management from the standpoint of habitat improvement and supplemental feeding. Various food plantings could be developed and the spread of other plants encouraged. Balanced supplemental feeding to correct deficiencies or to prevent starvation could appreciably raise the number of animals available to the sportsman."

Knoder, Eugene. (Rt. 5, Athens, Ohio.) LET'S TALK TURKEY. Ohio Cons. Bul. 19(4 sic): 6-7, illus. May 1955.
History of wild turkey in Ohio, account of restoration attempts and difficulties, data on movements and fate of released birds, and summary of recent breeding records. "The present status of the wild turkey may be summarized as follows: 204 wild turkeys have been released over a three-year period. Today the wild turkey population is estimated at 50-70 individuals. Reproduction in 1954 was especially encouraging." It is still too early to predict the outcome of the project. Part of the trouble is that no 100% wild turkeys have been available for restocking.

Mosby, Henry S. (Va. Polytechnic Inst.) THE WILD TURKEY IN VIRGINIA. Va. Wildl. 16(6): 20-22, illus. June 1955.
Turkeys still occur naturally in nearly 2/3 of Va. counties and in all parts of state except southwest. But a tabulation of statewide kills, 1927-55, shows that the take has dropped from 6,000-7,000 in 1930's to around 2,000 in 1950's. Causes are unknown. Heavy lumbering throughout state may be a factor. Some recovery of populations has appeared in nw. mountain section, but not in Piedmont. Status of Tidewater populations borders on the alarming. Liberation of thousands of pen-reared turkeys has not given encouraging results. Size of a turkey population seems to be related to proportion of successful nesting attempts. Average brood size, especially in Sept., may be used to indicate general status of population and number of turkeys that will be available to hunters.

BIRDS--TURKEY--Continued

Schultz, Vincent. (Johns Hopkins School Hygiene, Balt., Md.) STATUS OF THE WILD TURKEY IN TENNESSEE. Migrant 26(1): 1-8. Mar. 1955.
This paper, based on part of state wildlife survey, gives data on present distribution of turkey in Tenn. and its distribution in state in recent decades. Present range is: The Unaka Range of mountains, the Cumberland Plateau, portions of the western Highland Rim, and portions of the Mississippi bottoms. Releases of game farm turkeys in Tenn. are listed.

Thomas, Carl H. RELATIONSHIPS OF WILD TURKEY SOCIAL AND SPATIAL BEHAVIOR TO MANAGEMENT. M. S. thesis, Okla. A & M Coll. viii + 67 p., illus. 1955. [Copy in US Dept. Int. Library.]

BIRDS--DOVES AND PIGEONS

Hosford, Hallock Jay. NESTING AND MIGRATION OF THE MOURNING DOVE IN NORTHERN INDIANA. Ind. Aud. Quart. 33(1): 3-10. Jan. 1955.
Summary: "During 1950 and 1951 a study of the Mourning Dove was carried on at West Lafayette, Indiana, which included a detailed nesting study, migration and population studies. The nesting study showed an average success of 60.8 percent in town and 38.5 percent in the country, with the most popular trees for nesting Austrian pine and white spruce. Most predation was caused by grackles destroying the eggs. The migration study entailed a road count which showed that December and January were the low points of the population and that August was the high point. In correlation with the nesting study it showed that 1950 was a much poorer productive year than 1951."

BIRDS--WATERFOWL

Aldrich, John W., and John H. Steenis. (US F&WS.) NECK-BANDING AND OTHER COLOR-MARKING OF WATERFOWL; ITS MERITS AND SHORTCOMINGS. J. Wildl. Mgt. 19(2): 317-318. Apr. 1955.
Banding with colored collars is useful in local studies and in studies of movements of given populations. Collars are harmful on ducks, but nearly unobjectionable on geese. Since different workers might duplicate marks, all neck-banding must be correlated through U. S. and Canadian wildlife services. To get an adequate number of sightings, it is essential to have prearranged cooperation by qualified observers at all points where the collared birds are likely to appear.

Bergman, Göran. WATERFOWL AND HUMAN SETTLEMENT IN THE ARCHIPELAGO. Suomen Riista 8: 141-146, illus. 1953.
In Finnish with English summary. Eider and goosander (Mergus merganser) are more sensitive to human interference than red-breasted merganser, tufted duck, or mallard. Goosanders seldom even attempt to nest near human settlements. Eider nests from which females are frightened are often plundered by crows. Tufted duck and red-breasted merganser learn to tolerate human activities. This is attributed to their strong attachment to colonies of such bold birds as common terns and black-headed gull. Such colonies should be protected on this account. Eiders should be allowed fairly large, woodless islands and protection at least during incubation. Goldeneyes readily use boxes put out near human settlements. Herring gulls have increased greatly in last 20 years in the Finnish archipelago. This increase should be stopped by sterilization of eggs, for no other birds thrive on islands that have too large a gull population.

Cade, Tom J. (U. Calif., Los Angeles.) RECORDS OF THE BLACK BRANT IN THE YUKON BASIN AND THE QUESTION OF A SPRING MIGRATION ROUTE. J. Wildl. Mgt. 19(2): 321-324. Apr. 1955.
A review of recent (1940-1952) distributional records of Branta nigricans in interior Alaska and Yukon Territory, plus historical records dating to 1851, suggest that there is a contingent of this predominately maritime goose that migrates through the Yukon Basin in spring.--Tom J. Cade.

BIRDS--WATERFOWL--Continued

Chattin, John E. (US F&WS.) ARE WE ADEQUATELY HARVESTING OUR WATERFOWL? Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 78-82. May 1954. [1955.]

When first-year mortality rates are considered with band recovery rates, it is possible to derive evidence about degree of kill of certain fractions of some populations. Such data are presented for mallard, pintail, and Canada goose in portions of Pacific Flyway. Differences between species, and between populations of a species, suggest that some populations could have withstood a heavier kill. "While it cannot be definitely stated that some species are being underharvested, there are strong indications that such may be the case. In the Pacific Flyway the coot, black brant, cackling goose, and pintail are perhaps the more obvious examples. Certain flocks of lesser snow geese and baldpates likewise appear to be underharvested in some areas..." "There are apparent evidences of both under and overutilization in selected species and in selected areas."

Cooch, Graham. (Cornell U.) MODIFICATIONS IN MASS GOOSE TRAPPING TECHNIQUE. J. Wildl. Mgt. 19(2): 315-316. Apr. 1955.

Modifications of method of mass trapping of flightless blue and lesser snow geese which reduces juvenile mortality. Utilizes flock psychology for its success.--G. Cooch.

Coulter, Malcolm W. (U. Maine.) SPRING FOOD HABITS OF SURFACE FEEDING DUCKS IN MAINE. J. Wildl. Mgt. 19(2): 263-267. Apr. 1955.

Analysis was made of foods eaten by 39 wood ducks, 20 black ducks, 12 green-winged teal, and one blue-winged teal taken from March to May. Sedges (Carex spp.) and burreeds (Sparganium spp.) comprised 1/2 to 2/3 of the diet of each group of ducks. Animal material made up about 10% of food. Principal foods eaten were those most readily available during periods of high water levels.--M. W. Coulter.

Grenquist, Pekka. ON THE NESTING OF THE GOOSANDER IN BIRD-BOXES. Suomen Riista 8: 49-59, illus. 1953.

In Finnish with English summary. Since populations of Mergus merganser in Finland have dwindled, nest box studies were launched. Suitable boxes were well utilized. Data are given on reproduction in boxes, on factors affecting use of boxes, and on proper construction of boxes. The paper should be of value to anyone concerned with the conspecific American merganser.

Helm, Lewis G. (Mo. Cons. Comm.) PLASTIC COLLARS FOR MARKING GEESE. J. Wildl. Mgt. 19(2): 316-317. Apr. 1955.

Canada geese were marked with plastic collars 1.5 inches wide by 6 inches long for local and regional movement studies. The collars remained on the geese from four months to two years and did not affect family behavior or feeding.--L. G. Helm.

Korschgen, Leroy J. (Mo. Cons. Comm.) FALL FOODS OF WATERFOWL IN MISSOURI. Mo. Cons. Comm., P-R Series no. 14. ii + 41 p., map. Mar. 1955.

"A total of 2,252 gizzard samples from 17 species of ducks and 184 samples from Canada geese was examined..." Samples all represent fall or early winter. Results of analyses are tabulated in detail for each species and discussed in general. Principal duck foods were corn, smartweeds, wild millets, acorns, and cutgrasses. Principal goose foods were wild millets, smartweeds, cutgrasses, spike-rushes, winter wheat, corn, galingales, and soybeans. The state's suggestions for waterfowl food plantings seem sound, for plants recommended are those that were found to be most used. Ingested lead shot was found in 4.2% of surface-feeding ducks and 6.1% of diving ducks. Data from a public hunting area supports the premise that shot becomes available to ducks primarily through the current year's shooting.

BIRDS--WATERFOWL--Continued

Koskimies, Jukka, and Eero Routamo. THE RATE OF SURVIVAL IN A VELVET SCOTER POPULATION. Suomen Riista 8: 183-184. 1953.

In Finnish with English summary. "29 breeding female velvet scoters have been caught and marked in the Aspskär bird sanctuary during the years 1948-53. Out of 23 individuals marked in 1948-52, 16 have been recaught during at least one of the subsequent summers, all on the same islet where they were marked. ...it can be calculated that up to the summer of 1953 in 32 out of 41 possible cases the female has returned the following summer to nest on the same islet. This means a very high minimum survival rate of 78 per cent among the breeding female velvet scoters of Aspskär."

Miskimen, Mildred. (Miami U., Oxford, Ohio.) METEOROLOGICAL AND SOCIAL FACTORS IN AUTUMNAL MIGRATION OF DUCKS. Condor 57(3): 179-184, graphs. May-June 1955.

Study of migrant black ducks, mallards, and lesser scaups at reservoir near Columbus, Ohio, in fall of 1951, showed that the daily cycle of resting and feeding was regulated by light intensity. Resting ducks "became increasingly active as light decreased in the evening. There was more activity among ducks on dark, overcast days than on bright days. Strong winds induced compact rafting of ducks; all faced the wind. Decreases in population number were recorded following evenings of clear sky and were often associated with flight in crescent-shaped flocks. A theory is proposed holding that during typical pre-frontal weather ducks may build up flock organization in response to decreased light, strong winds and possibly other weather factors; when clearing weather follows, mutual stimulation in organized flocks facilitates movement from the area. The rate and time of migratory movements may thus be strongly influenced."

Salter, Robert L. (Idaho Game Dept.) THE TRUMPETER SWAN IN IDAHO. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 254-257. May 1954. [1955.]

Geographic and seasonal distribution of this swan in Idaho, illegal kill (10-20 per year in state), table showing (by states and age classes) trumpeter swan population of U. S., 1949-53.

Shoemaker, Carl D. (Natl. Wildl. Fed.) YOUR DUCK STAMP MONEY AND WHERE IT GOES. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 5-19. May 1954. [1955.]

Most detailed discussion of this controversial subject that the reviewer has seen.

Singleton, J. R. (Texas Game Comm.) REVIEW OF THE 1954 TEXAS WATERFOWL SEASON. Texas Game & Fish 13(5): 7-9, 29, illus. May 1955.

Continued drought, intensified agriculture, and gun pressure have caused a large proportion of the state's wintering waterfowl to desert the eastern coast of Texas for the western Texas coast or points further south. Figures on this shift are given from winter censuses, 1948-54.

Titus, Harold. TOMORROW IS TOO LATE! Field & Stream 59(12): 52-53, 139-145. Apr. 1955.

A relatively detailed, popular report on the increasing loss of waterfowl habitat and what state and federal governments are doing about it. It is said that 12 million acres of waterfowl land is needed in the U. S. The federal government now has only 3¼ million acres in refuges and the rate of acquisition is slow. Many fine state programs are described, but state waterfowl lands still total only about 600,000 acres. Few such lands are now available for purchase in some states. The speed of acquisition and creation of marsh areas will have to be increased drastically if we wish to keep our waterfowl populations. At the present rate of progress it will take generations to safeguard the 12 million-acre minimum; meanwhile, ground is being lost faster than it is being gained.

BIRDS--WATERFOWL--Continued

Winston, Frank A. (Fla. Game Comm.) COLOR MARKING OF WATERFOWL. J. Wildl. Mgt. 19(2): 319, map. Apr. 1955.
During spring 1954, 583 ducks were banded and dyed a distinctive red at Okeechobee, Fla. for identification in migration. Twelve sight reports were obtained from 7 states, 5 of them northern. Red, green and yellow will be used by Fla. during winter-spring 1955.--Frank A. Winston.

Wrakestraw, George F., and Robert M. Ballou. (Wyo. Game Comm.) MIGRATION PATTERNS OF WYOMING PINTAILS. Proc. 34th An. Conf. West. Assn. St. Game & Fish Comms. p. 276-278. May 1954. [1955.]
See WR 77: 56.

BIRDS--CRANES, RAILS, SHOREBIRDS

Kiel, William H., Jr. (U. Wis.) NESTING STUDIES OF THE COOT IN SOUTHWESTERN MANITOBA. J. Wildl. Mgt. 19(2): 189-198, graphs. Apr. 1955.
Ground transects and study potholes provided data on population and nesting trends of Fulica americana in prairie pothole habitat in sw. Manitoba during the 4-yr. period, 1949-1952. In 3 yrs., 80% of all successful nests hatched prior to June 16; in 1950, a phenologically late yr., no hatched nest was found before that date. Breeding population indices and numbers of nests declined approx. 60% from 1949 through 1952. A shift of birds to better habitat or an overall decline in population are possible reasons for this decline. Typha latifolia and Scirpus acutus cover in the more permanent potholes was preferred by nesting birds. Nesting success was 97% of 380 nests over the 4-yr. period. Mean clutch size of 169 complete clutches was 9.9 eggs. Egg hatchability was 99% of 1,394 eggs in successful nests with complete clutch counts.--W. H. Kiel, Jr.

Koskimies, Jukka. THE GULL PROBLEM. Suomen Riista 8: 77-88, illus. 1953.
In Finnish with English summary. Lesser black-backed gulls have increased considerably in parts of Finland. Ordinarily they travel long distances to get foods from commercial fisheries, but when bad weather closes in they may turn to eating young waterfowl, especially velvet scoters, and thereby do much damage. This damage is local, however, and is caused by a small part of the population. Control should also be local and directed at the offending individuals.

Pitelka, Frank A. GEOGRAPHIC VARIATION AND THE SPECIES PROBLEM IN THE SHOREBIRD GENUS LIMNODROMUS. U. Calif. Pub. Zool. 50(1): 1-108, illus. 1950. $2.00.
Systematic study of the dowitchers.

Zucca, Joseph J. (U. San Francisco, Calif.) A STUDY OF THE CALIFORNIA CLAPPER RAIL. Wasmann J. Biol. 12(2): 135-153, illus. Summer 1954.
Density of clapper rails in the 63.0-acre Dumbarton Bridge marsh was 0.98 birds per acre in 1950 and 1.21 per acre in 1951. A normal nesting period seemed to begin in April and cease in June. An interrupted nesting period extended to late July. Nests were of 3 general types: Spartina type, at lowest marsh level; Grindelia type, at intermediate level; and Salicornia type, at highest level. The first 2 types were constructed in a normal nesting season. The third type appeared to be used only when spring tides forced rails to nest at higher levels. High spring tides of +6.7 feet or more caused total loss of eggs on the 2 lower levels. Average number of eggs per nest was 7.22. Rats (R. norvegicus) destroyed no eggs that were in active nests, contrary to other reports. Both rats and rails attacked eggs of abandoned or disrupted nests. Some other information on habits of these rails is given.

OTHER BIRDS

Anonymous. OUR NATIONAL EMBLEM IS ENDANGERED. Raven 26(4): 58. Apr. 1955.
Mr. K. D. Morrison (Natl. Aud. Soc., N. Y.) reported that bald eagles have decreased alarmingly in U. S. and may be down to 1,000 pairs. Major areas where still found in fair numbers are Fla., Chesapeake Bay region, and Great Lakes. Eagle population in 4 counties of w. Fla. decreased 80% in 10 years. Inimical factors are thought to be illegal shooting and cutting of tall trees required for eyries. Natl. Aud. Soc. is beginning an inventory of U. S. eagle population.

Bliese, John C. W. ROOSTING OF BRONZED GRACKLES AND AVIAN ASSOCIATES AT AMES, IOWA. Doctoral thesis, Iowa St. Coll. 1953. [From long abstract in Iowa St. Coll. J. Sci. 29(3).]
Birds favored larger trees with dense crowns, and preferred closely grouped trees to isolated trees. Grackles, starlings, cowbirds, and robins comprised the flights. Species varied in flight height, time of beginning flights, and flight peaks, and all were influenced by wind velocity, cloudiness, season, and zenith light.--L. F. Stickel.

Bruijns, M. F. Mörzer, and S. Braaksma. THE STATUS OF THE WHITE STORK IN THE NETHERLANDS IN THE YEAR 1950. Beaufortia (Zool. Mus., Amsterdam) 5(45): 23-43, maps. Apr. 1955.
In Dutch, with English summary and legends. Decline of the famous white stork has caused wide concern in Europe. This paper reports on the census of 1950, in which cooperative effort was made to tabulate each nest in Holland. "The tables clearly show that the total number of occupied nests has seriously decreased since the last complete census. In fact the number fell down to 85 occupied nests. Compared with 1939, a decrease of the number of young of 76% and of the number of breeding pairs of 73% was calculated. The future of the white stork as a breeding bird in the Netherlands seems to be rather precarious."

Davis, John. DISTRIBUTION AND VARIATION OF THE BROWN TOWHEES. U. Calif. Pub. Zool. 52(1): 1-120, illus. 1951. $1.25.

Dennis, John V. (Rt. 1, Box 376, Leesburg, Va.) A FALL STUDY OF THE FOOD HABITS OF THE COMMON STARLING (STURNUS VULGARIS) IN NORTHERN VIRGINIA. Raven 26(4): 51-54. Apr. 1955.
Report on kinds and relative abundances of seeds found beneath roosts. Apparently starlings commonly regurgitate seeds and other hard objects. Evidence is given to show that such behavior is much more prevalent among passerines than is usually supposed.

DuMont, Philip A. (US F&WS.) GOONEYS SIT OUT SECOND BATTLE OF MIDWAY. Natl. Parks Mag. 29(121): 66-68, illus. Apr.-June 1955.
Black-footed and Laysan albatrosses nest on Midway Islands in Pacific and cause expensive damage to planes that collide with them. These gooneybirds refuse to be frightened away by smoke, noise, explosions, or ultrahigh frequencies. They do tend to scatter after 4 days if their eggs are stolen, and they are unable to lay second eggs, at least for a long time. Several banded gooneys were recovered after 16 years. There was little if any interchange of birds between 2 nearby islands. Since the birds will not leave their areas and no one wishes to destroy them (naval personnel enjoy watching them, especially in courtship), it was suggested that planes land after dark when gooneys are not flying. As accidents occur under 200 feet, it was recommended that take-offs be as short and steep as feasible. Planes of a few years hence are expected to bypass Midway for a shorter route.

Gordon, Malcolm S. (Yale U.) SUMMER ECOLOGY OF OCEANIC BIRDS OFF SOUTHERN NEW ENGLAND. Auk 72(2): 138-147, map. Apr. 1955.

King, James R. (St. Coll. Wash.) NOTES ON THE LIFE HISTORY OF TRAILL'S FLYCATCHER (EMPIDONAX TRAILLII) IN SOUTHEASTERN WASHINGTON. Auk 72(2): 148-173, graphs. Apr. 1955.
Detailed study of many aspects of life history.

OTHER BIRDS--Continued

Lowe, Frank A. THE HERON. Collins, London. 177 p., illus. 1954. 18s. [From review by Monica de la Salle, Aud. Mag. 57(3).]
Monograph on Ardea cinerea of Europe and Britain, a close relative of our great blue heron. Economics of the species are considered carefully. "This is just one of the aspects treated...; distribution, population, biology, habits, and migration are also included, and there are chapters on the folklore, the hunting, and the eating of herons."

Murphy, Robert Cushman. (Am. Mus. Nat. Hist., N. Y.) FEEDING HABITS OF THE EVERGLADE KITE (ROSTRHAMUS SOCIABILIS). Auk 72(2): 204-205. Apr. 1955.
The kite does not pull the snail out of its shell and tear it to pieces. It stabs into a nerve center, causing the snail to relax. Snail is then swallowed whole.

Orians, Gordon. THE RED-TAILED HAWK IN WISCONSIN. Passenger Pigeon 17(1): 3-10, illus. Spring 1955.
Status, distribution and migration in state, plumage variation, nesting, nesting success, density of a local breeding population, foods, position in mind of public. Red-tails are relatively common in Wis. and are thought to be favored by agricultural development. A breeding population had a density of 1 pair per 2.22 sq. mi. State law protects all hawks but public opinion is still solidly against them, so slaughter continues.

Suomus, Heikki. ON THE FOOD OF THE BUZZARD. Suomen Riista 8: 36-41, illus. 1953.
In Finnish with English summary. Careful observations of food items brought to nests by Buteo buteo vulpinus, and of activities of these birds. It was found that fluctuations in numbers of a prey species were reflected in numbers eaten. Study of food remains at nest gives an exaggerated idea of predation on birds and game animals, for small mammals and frogs are poorly represented by remains.

Yeager, Lee E. (Colo. A & M Coll.) TWO WOODPECKER POPULATIONS IN RELATION TO ENVIRONMENTAL CHANGE. Condor 57(3): 148-153, illus. May-June 1955.
Response of woodpecker populations to bottomland hardwoods killed by flooding in Ill. and spruce-fir stands killed by bark beetles in Colo. The birds increased greatly (by concentration and reproduction) when insects in trees were at peak. In Colo., entomologists credit the large number of woodpeckers with serving an important beetle-control function.

Young, Howard. (W. Ill. St. Coll., Macomb.) BREEDING BEHAVIOR AND NESTING OF THE EASTERN ROBIN. Am. Midl. Nat. 53(2): 329-352, illus. Apr. 1955.
A detailed paper. Includes life curve for the robin and much information on nesting success.

REPTILES AND AMPHIBIANS

Brown, Bryce Cardigan. THE HERPETOLOGY OF THE COASTAL PRAIRIE REGION OF TEXAS. Ph.D. thesis, U. Mich. 261 p. 1955. [From long abstract in Dissertation Abstracts 15(4).]
"...how the distributions of individuals and species are related to physiographic, geologic, edaphic, climatic, and other biotic factors. Major consideration was given to differences in species composition in different regional biotic units... The geographic distribution, abundance, environmental preferences, pertinent aspects of life history, and ecological data on each of the 17 amphibians and 54 reptiles found in the coastal prairie are given."

Cook, S. F. RESPIRATORY METABOLISM OF CERTAIN REPTILES AND AMPHIBIA. U. Calif. Pub. Zool. 53(10): 367-376, illus. 1949. 25¢.

REPTILES AND AMPHIBIANS--Continued

Dessauer, Herbert C. (La. St. U. School Med., New Orleans.) SEASONAL CHANGES IN THE GROSS ORGAN COMPOSITION OF THE LIZARD, ANOLIS CAROLINENSIS. J. Exp. Zool. 128(1): 1-12, graphs. Feb. 1955.

Fox, Wade. (La. St. U.) GENETIC AND ENVIRONMENTAL VARIATION IN THE TIMING OF THE REPRODUCTIVE CYCLES OF MALE GARTER SNAKES. J. Morph. 95(3): 415-450, graphs. Nov. 1954.
Slight differences were found between the races of Thamnophis sirtalis and those of Thamnophis elegans. It is suggested that the rise and fall of spermatogenic activity in Thamnophis may be correlated with the number of hours per day a snake can maintain its body temperature within normal activity range. --L. F. Stickel.

Holman, J. Alan. (Naval Hospital, Memphis, Tenn.) FALL AND WINTER FOOD OF PLETHODON DORSALIS IN JOHNSON COUNTY, INDIANA. Copeia 1955(2): 143. Apr. 1955.

Kezer, James, and Donald S. Farner. (U. Ore.) LIFE HISTORY PATTERNS OF THE SALAMANDER AMBYSTOMA MACRODACTYLUM IN THE HIGH CASCADE MOUNTAINS OF SOUTHERN OREGON. Copeia 1955(2): 127-131. May 1955.

Lowe, Charles H., Jr. (U. Ariz.) THE EASTERN LIMIT OF THE SONORAN DESERT IN THE UNITED STATES WITH ADDITIONS TO THE KNOWN HERPETOFAUNA OF NEW MEXICO. Ecol. 36(2): 343-345. Apr. 1955.
It is shown that Sonoran Desert representatives of various groups of animals and plants extend into Hidalgo and Grant counties, sw. N. M., in drainages of Gila River and San Simon Creek.

Miller, Loye. (MVZ, U. Calif., Berkeley.) FURTHER OBSERVATIONS ON THE DESERT TORTOISE, GOPHERUS AGASSIZI, OF CALIFORNIA. Copeia 1955(2): 113-118, illus. May 1955.
Variability of young, egg laying, incubation period, development of young, marking and loss of marks, urinary calculi.

Miller, Malcolm R. THE SEASONAL HISTOLOGICAL CHANGES OCCURRING IN THE OVARY, CORPUS LUTEUM, AND TESTIS OF THE VIVIPAROUS LIZARD, XANTUSIA VIGILIS. U. Calif. Pub. Zool. 47(8): 197-224, illus. 1948. 65¢.
See vol. 47 no. 9 of same series for related paper on pituitary changes.

Moyle, Don Leigh. LIFE HISTORY OF THE BULLFROG IN CENTRAL MISSOURI FARM PONDS. M. A. thesis, U. Mo. 7 + 89 p. 1952. [Copy in US Dept. Int. Library.]

Rodgers, Thomas L., and Henry S. Fitch. VARIATION IN THE SKINKS (REPTILIA: LACERTILIA) OF THE SKILTONIANUS GROUP. U. Calif. Pub. Zool. 48(4): 169-220, illus. 1947. $1.00.

Slater, James R. DISTRIBUTION OF WASHINGTON AMPHIBIANS. Coll. Puget Sound, Dept. Biol., Occ. Papers no. 16. p. 122-154, graphs. Mar. 1955.
Range, county records, and life-zone distribution of each species. Data are based on much field work and on material in major collections.

Stebbins, Robert C., and Harry B. Robinson. FURTHER ANALYSIS OF A POPULATION OF THE LIZARD SCELOPORUS GRACIOSUS GRACILIS. U. Calif. Pub. Zool. 48(3): 149-168, illus. 1946. 50¢.

Stebbins, Robert C. (MVZ, U. Calif., Berkeley.) NATURAL HISTORY OF THE SALAMANDERS OF THE PLETHODONTID GENUS ENSATINA. U. Calif. Pub. Zool. 54(2): 47-124, illus. Dec. 1954. $1.25.
A comprehensive study, based chiefly on results of observations of two marked populations. Population study included behavior in relation to rainfall, heat, and cold, effect of a stream barrier, and estimates of population density. Study of individuals included home range behavior, growth, longevity, shedding, regeneration, reproduction, feeding habits, and effect of environmental factors. Supplemental notes to previous systematic studies are appended.--L. F. Stickel.

REPTILES AND AMPHIBIANS--Continued

Tanner, Wilmer W. (Brig. Young U.) A STUDY OF TAXONOMY AND PHYLOGENY OF LAMPROPELTIS PYROMELANA COPE. Great Basin Nat. 13(1-2): 47-66, illus. Sept. 1953.
Forms placed as subspecies of pyromelana are knoblochi, woodini, and infralabialis. The last 2 are described as new. Key and map are provided. Intra- and interspecific relationships are discussed.

Wood, John Thornton, and Frances Edmonds Wood. (U. Va.) NOTES ON THE NESTS AND NESTING OF THE CAROLINA MOUNTAIN DUSKY SALAMANDER IN TENNESSEE AND VIRGINIA. Rep. Reelfoot Lake Biol. Sta. 19: 36-39. Jan. 1955. [Same as J. Tenn. Acad. Sci. 30(1).]

Wood, John Thornton. (U. Va.) THE NESTING OF THE FOUR-TOED SALAMANDER, HEMIDACTYLIUM SCUTATUM (SCHLEGEL), IN VIRGINIA. Am. Midl. Nat. 53(2): 381-389, map. Apr. 1955.

FISHES

Kilby, John D. (U. Fla.) THE FISHES OF TWO GULF COASTAL MARSH AREAS OF FLORIDA. Tulane Stud. Zool. 2(8): 175-247, graphs. May 1955. $1.00.
Comparative ecological study of fishes of Bayport and Cedar Key tidal marshes. Includes annotated list of 75 species.

VEGETATION--GENERAL, ECOLOGY, CONTROL, TECHNIQUES

Bramble, W. C., and W. R. Byrnes. (Pa. St. U.) PROGRESS REPORT ON THE EFFECT OF CERTAIN BRUSH CONTROL TECHNIQUES AND MATERIALS ON GAME FOOD AND COVER ON A POWER LINE RIGHT-OF-WAY. NO. II. Proc. 9th An. Meeting NE. Weed Control Conf. p. 417-427, mimeo. Jan. 1955.
Detailed vegetative analysis of effect of 2,4-D and 2,4,5-T and Ammate applied by various methods and in different formulations. All were effective in immediate top-kill of tree sprouts. Effects on resprouting and composition of ground layer varied.--L. F. Stickel.

Dahms, Walter G., and George A. James. BRUSH CONTROL ON FOREST LANDS WITH EMPHASIS ON PROMISING METHODS FOR THE PACIFIC NORTHWEST (A REVIEW OF SELECTED REFERENCES). US Forest Serv., Pacific NW Forest & Range Exp. Sta. (Portland, Ore.), Res. Pap. no. 13. iii + 81 p. May 1955.
Valuable compilation for all concerned with brush control. The first 32 pages contain good discussion of control by all sorts of means: chemicals, machines, fire, animals, combination treatments. Pros and cons of each are listed. A graph shows distance of drift of droplets of different sizes. Appendices tabulate effects of herbicides on brush species of NW and show how to make up desired concentrations of 2,4-D or 2,4,5,-T. The bibliography contains 239 titles. A subject index to this bibliography is provided.

Egler, Frank E. (Am. Mus. Nat. Hist., N. Y.) VEGETATION MANAGEMENT FOR RIGHTS-OF-WAY AND ROADSIDES. Smithsonian Rep. for 1953: 299-322, illus. (Publication 4157.) 1954.
Brings together in fair detail yet in compact form the ideas on this subject previously reported by Egler in various publications. It emphasizes the author's belief in the importance of rights-of-way as potential wildlife habitat, the advantage of selective basal spraying as opposed to summer-foliage blanket spraying of herbicides, and the superiority of shrubby growth over grasses both for resisting invasion of trees and for wildlife use.--Fred H. Dale.

VEGETATION--GENERAL, ECOLOGY, CONTROL, TECHNIQUES--Continued

Horton, J. S., and C. J. Kraebel. (US Forest Serv., Berkeley, Calif.) DEVELOPMENT OF VEGETATION AFTER FIRE IN THE CHAMISE CHAPARRAL OF SOUTHERN CALIFORNIA. Ecol. 36(2): 244-262, illus. Apr. 1955.

Composition of permanent cover changed little if any after burns, although relative abundance of the several shrub species occasionally did change. A temporary cover developed soon after a burn and reached a peak of growth and density in 2-5 years. Most species of this cover disappeared completely as permanent cover matured. The study extended from 1927-1952.--L. F. Stickel.

Juhren, Gustaf, Rupert Pole, and James O'Keefe. (US Forest Serv., Pasadena, Calif.) CONVERSION OF BRUSH TO GRASS ON A BURNED CHAPARRAL AREA. J. Forestry 53(5): 348-351, illus. May 1955.

Seeding following an intense wildfire in Calif. resulted in good stand of Italian ryegrass. Reestablishment of chaparral was prevented by 3 herbicidal sprays. Small experimental plots showed favorable results with mountain brome and Wimmera ryegrass, but less favorable results with orchard grass and red fescue. Grass cover is considered desirable for erosion control and relative ease of fire control.

Niering, Wm. A., and Frank E. Egler. (Conn. Coll.) A SHRUB COMMUNITY OF VIBURNUM LENTAGO, STABLE FOR TWENTY-FIVE YEARS. Ecol. 36(2): 356-360, illus. Apr. 1955.

Summary: "1. A pure stand, about 15 x 15 meters in size...was considered to have arisen fortuitously at least 25 years ago, with other shrubs, if present, dying out in competition. 2. As based on quadrat studies, the stand is essentially one-layered, and relatively pure. Small shrubs, herbs, mosses, and seedlings are unimportant. 3. There are few and uncertain evidences of an invading tree stage, and the community appears relatively stable and self-perpetuating. 4. The species has high wildlife values, and physically is suited for the sides of the rightofways of utility corporations, where its preservation, if it already occurs, will improve future low-cost maintenance, public relations, and conservation values."

Sampson, Arthur W., and L. T. Burcham. COSTS AND RETURNS OF CONTROLLED BRUSH BURNING FOR RANGE IMPROVEMENT IN NORTHERN CALIFORNIA. Calif. Div. Forestry (Sacramento), Range Improvement Studies no. 1. 41 p. [1954.] [From Monthly Checklist of State Publications 46(1).]

Schultz, A. M., J. L. Launchbaugh, and H. H. Biswell. (U. Calif., Berkeley.) RELATIONSHIP BETWEEN GRASS DENSITY AND BRUSH SEEDLING SURVIVAL. Ecol. 36(2): 226-238, illus. Apr. 1955.

An intensive technical study made in Madera Co., Calif. Has practical applications for range management in regions of Mediterranean climate. "...reseeding following clearing of dense brush results in...a biological control measure on the subsequent brush population." Brush seedling mortality appeared to be chiefly a matter of competition for soil moisture. Seeding must be done the first season, before brush seedling roots have penetrated deeply.--L. F. Stickel.

Schultz, A. M., and H. H. Biswell. (U. Calif., Berkeley.) BRUSH CONTROL WITH CHEMICALS. Calif. Agr. 9(5): 5, 13, graphs. May 1955.

Various rates and formulations of 2,4-D and 2,4,5-T were tested against Calif. chaparral seedlings for improvement of game range. "Results of the tests indicate that when sprays are used, the best kills can be obtained when applied to current year seedlings in the early spring after germination is complete and at the approximate rate of four pounds of acid per acre."

VEGETATION--FLORAS AND COMMUNITIES

Tryon, Rolla M., Jr. THE FERNS AND FERN ALLIES OF MINNESOTA. U. Minn. Press. 166 p., illus. 1954. $4.00.
Keys, brief characterizations of each species, and many beautiful drawings make this a highly satisfactory manual. Habit drawings are mostly silhouettes and look like the plants they are meant to represent. The many drawings of details are large and clear.--Neil Hotchkiss.

VEGETATION--TREES

Baker, Harold L., and Adon Poli. AREA AND OWNERSHIP OF FOREST LAND IN TEHAMA COUNTY, CALIFORNIA. US Forest Serv., Calif. Forest & Range Exp. Sta. (Berkeley), Forest Survey Release no. 26. iii + 23 p., illus. Apr. 1955.

Bourdo, Eric Albert, Jr. A VALIDATION OF METHODS USED IN ANALYZING ORIGINAL FOREST COVER. Ph.D. thesis, U. Mich. 224 p. 1955. [From long abstract in Dissertation Abstracts 15(4).]
"This study is an attempt to evaluate methods based on the General Land Office Survey for quantitative and qualitative reconstructions of original vegetation. The work is centered in four localities in the western portion of the Upper Peninsula of Michigan where sizeable tracts of old-growth timber still remain, or were logged only recently." Methods of forestry and statistics are applied to the problem. The paper should be an important guide for the type of studies it covers.

Gleason, Lowell S. ACTION OF HERBICIDES ON WOODY PLANTS. Doctoral thesis, Iowa St. Coll. 1953. [From long abstract in Iowa St. Coll. J. Sci. 29(3).]
Comparisons of several herbicides. Different formulations, concentrations, carriers, and methods were compared for effectiveness.--L. F. Stickel.

Larson, Edwin H., and others. FOREST RESOURCES OF NEW HAMPSHIRE. US Forest Serv., Forest Resource Rep. no. 8. iv + 39 p., illus. 1954. 45¢ from Superintendent of Documents. [From Monthly Catalog of US Govt. Pub., Jan. 1955.]

Minnesota. THE FOREST RESOURCE OF PINE COUNTY. Office of Iron Range Resources & Rehabilitation, 624 State Office Bldg., St. Paul 1, Minn. 1-58 p., illus. [1955.]

Nelson, Thomas C. (US Forest Serv., Asheville, N. C.) CHESTNUT REPLACEMENT IN THE SOUTHERN HIGHLANDS. Ecol. 36(2): 352-353. Apr. 1955.
"...the trend to date indicates that chestnut is being replaced primarily by the advancement of species which were codominant with chestnut and secondarily by invasions and the advancement of subordinate species, especially yellow-poplar."--L. F. Stickel.

Northeast Forest Survey. FOREST STATISTICS FOR NEW YORK FOREST DISTRICT NO. 15. US Forest Serv., NE Forest Exp. Sta. (Upper Darby, Pa.), Forest Statis. Ser.: N. Y. no. 15. ii + 19 p. 1954.
Long Island.

Rice, E. L., and Wm. T. Penfound. (U. Okla.) AN EVALUATION OF THE VARIABLE-RADIUS AND PAIRED-TREE METHODS IN THE BLACKJACK-POST OAK FOREST. Ecol. 36(2): 315-320. Apr. 1955.
The standard for comparison was a complete tree census of a 4.36 and a 4.63-acre plot. The variable-radius method was found to be unsuitable for obtaining frequency data, but gave satisfactory data on basal area. "The paired-tree technique...was insufficiently accurate, due probably to the small sample utilized." "An augmented variable-radius method was chosen for future forest analysis. This consisted of the usual variable-radius technique for determining basal area, supplemented by 40 arm-length transects of 0.01 acre each for procuring data on density and frequency."--L. F. Stickel.

VEGETATION--TREES--Continued

Saskatchewan. SASKATCHEWAN'S FORESTS. Sask. Dept. Nat. Resources, Regina. [iv +] 129 p., illus. 1955.
An unusually interesting and readable account prepared for general use, including school use. It is devoted almost entirely to the commercial forest belt of central Sask. Climate and physical geography are discussed as background for information on history, present condition, uses, and proper management. Forest statistics are given in an appendix, as are sections on forest diseases, forest insects, and Thornthwaite climatic statistics. Maps and numerous photographs aid in making this bulletin an exceptionally fine means of disseminating knowledge of forest potentialities and problems in the province.

VEGETATION--PASTURE AND RANGE

Cook, C. W., L. A. Stoddart, and L. E. Harris. THE NUTRITIVE VALUE OF WINTER RANGE PLANTS IN THE GREAT BASIN, AS DETERMINED WITH DIGESTION TRIALS WITH SHEEP. Utah Agr. Exp. Sta. (Logan), Bul. 372. 56 p., illus. 1954.

McCaleb, John E. AN ECOLOGICAL AND RANGE VEGETATION ANALYSIS OF THE UPLAND SITES OF THE SOUTHERN EXTENSION OF THE OAK-HICKORY FOREST REGION IN TEXAS. Ph.D. thesis, Texas A & M Coll. 1954. [From long abstract in J. Range Mgt. 8(2).]

Morrill, John Barstow. PRAIRIE FLORA ON THE MISSOURI RIVER BLUFFS OF WESTERN IOWA. Master's thesis, Iowa St. Coll. 1954? [From Iowa St. Coll. J. Sci. 29(3).]

VEGETATION--WET-LAND

Forest, Herman Silva. HANDBOOK OF ALGAE. U. Tenn. Press (Knoxville 16). 469 p., 698 figs. 1954. $4.75. [From A.I.B.S. Bul. 5(2).]
"This handbook was prepared primarily for use in Tennessee and the Southeastern States. It summarizes several 'check-lists' published during recent years by phycologists of this region. A key to genera precedes the large section of the book devoted to more detailed description of each family and genus. Illustrations are line drawings."

GENERAL CONSERVATION, WATER, AND CLIMATE

Hoyt, William G., and Walter B. Langbein. FLOODS. Princeton U. Press. 469 p., illus. 1955. $7.50. [From review by Victor Mockus, Soil Cons. 20(11).]
An excellent book by 2 hydraulic engineers who have tried to be as impartial as possible. "The ten chapters give you such generally unavailable information as the generation and life history of floods; the damages suffered from past floods in the United States and how such damages are determined; a review of legislation and present flood control policy (to 1953); and such useful reference data as the problems, projects, and plans of the major watersheds of the nation, with maps showing sites of proposed and existing large dams, and an historical review of past floods. Most important of all, there is a review and discussion of what has been done about flood prevention in the past, and what can be--or ought to be--done about floods in the future." "...after promising us bigger and more ghastly floods on the populated valley lands in the future, they offer flood plain zoning, insurance, and forecasting as the eventual solutions to floods on the larger streams. For the smaller streams, they admit that small dams will do some good, but turning the upstream bottom lands into pasture seems the ideal solution to them. Corn Belt farmers may disagree..." "The reluctance of Hoyt and Langbein to accept 'land use practices' as a major flood prevention method is based on the lack of streamflow data from conservation treated large watersheds."

GENERAL CONSERVATION, WATER, AND CLIMATE--Continued

Reuss, L. A. FLORIDA'S LAND RESOURCES AND LAND USE. U. Fla., Agr. Exp. Sta. (Gainesville), Bul. 555. 1-52 p., maps & graphs. Nov. 1954.
Survey of agriculture and forestry in relation to soils and climate. Includes many figures on acreages and distribution of various crops.

Sparkes, Charles H., and Murray F. Buell. (Rutgers U.) MICROCLIMATOLOGICAL FEATURES OF AN OLD FIELD AND AN OAK-HICKORY FOREST IN NEW JERSEY. Ecol. 36(2): 363-364. Apr. 1955.
Weekly temperature readings taken at various levels in a mature oak-hickory woods and in several habitats in a 40-year old abandoned field showed pronounced annual and seasonal differences between themselves and between them and the local Weather Bureau station.--L. F. Stickel.

Stall, J. B., J. B. Fehrenbacher, L. J. Bartelli, G. O. Walker, E. L. Sauer, and S. W. Melsted. WATER AND LAND RESOURCES OF THE CRAB ORCHARD LAKE BASIN. Ill. Water Surv. Div., Bul. no. 42. iii + 53 p., illus. 1954.
Important report on present water supply, potential water supply, siltation, soils, agricultural economics, present and recommended land uses, and soil conservation measures needed. "It is estimated that the total cost of establishing the conservation program recommended would amount to an average of $38.47 per acre. On the basis of this cost, only four years of increased production resulting from such a program would pay for the cost of establishing it."

SOILS

Goldston, E. F., and others. SOIL SURVEY OF AVERY COUNTY, NORTH CAROLINA. US Soil Cons. Serv., Series 1946, no. 1. 1-118 p., illus. + large folding maps. Mar. 1955. Price not stated. Order from Superintendent of Documents.

McMiller, P. R., and others. SOIL SURVEY OF McLEOD COUNTY, MINNESOTA. US Soil Cons. Serv., Series 1940, no. 17. 1-43 p., illus. + large folding maps. June 1955. $1.50 from Superintendent of Documents.

Smith, L. R., and others. SOIL SURVEY OF CASS COUNTY, INDIANA. US Soil Cons. Serv., Ser. 1939, no. 24. 1-129 p. + large folding maps. Apr. 1955. $1.75 from Superintendent of Documents.

TRANSLATIONS OF RUSSIAN WILDLIFE LITERATURE

Translations listed in this section were made at the Bureau of Animal Population, Oxford, England. They were received after those listed in WR 76. A carbon copy of each is filed in the office of the Section of Distribution of Birds and Mammals, U. S. Fish & Wildlife Service, Room 61, U. S. National Museum. They may be studied in that office or they may be borrowed on interlibrary loan through the Department of Interior Library, Washington 25, D. C. Requests for loans should be addressed to that library. The translation desired should be identified by translation number, author, title, and journal reference.

The list that follows was provided through the courtesy of Miss Emma M. Charters, US F&WS.

Kirikov, S. ON THE DISTRIBUTION OF THE BLACK HAMSTER (CRICETUS CRICETUS) AND THE NUMERICAL RELATION BETWEEN IT AND THE COMMON FORM. Zool. Zh. 13: 361-368. 1935. TRANS. 140.

Kistyakoviskii, A. B. AN ENQUIRY INTO THE ECONOMIC IMPORTANCE OF THE BIRDS OF PROTECTIVE STRIPS OF WOODLAND AND AN EXPERIMENT IN THE ATTRACTION OF USEFUL SPECIES. Summary of Research Work of Inst. of Plant Protection, Leningrad, for 1935. p. 215-216. 1936. TRANS. 157.

TRANSLATIONS OF RUSSIAN WILDLIFE LITERATURE--Continued

Mel'nichenko, A. N. THE IMPORTANCE OF PROTECTIVE STRIPS OF WOODLAND IN PROPAGATING FAUNA USEFUL AND HARMFUL TO AGRICULTURE. Summary of Research Work of Inst. of Plant Protection, Leningrad, for 1935. p. 202. 1936. TRANS. 158.

Milyutin, N. G. A NOTE ON THE REPRODUCTION OF THE MOLE (TALPA EUROPAEA BRAUNERI SATUN). Zool. Zh. 20(3): 482-484. 1941. TRANS. 146.

Nasimovich, A. A. BIOLOGY OF THE WEASEL IN KOLA PENINSULA. Zool. Zh. 28: 177-182. 1949. TRANS. 257.

Novikov, G. A. ON THE ECOLOGY OF THE WOOD LEMMING (MYOPUS SCHISTICOLOR LILLJEB.) ON KOLA PENINSULA. Zool. Zh. 20: 626-631. 1941. TRANS. 148.

Parfent'ev, V. YA. STUDY OF THE SPECIES COMPOSITION OF TREES AND BUSHES INTRODUCED INTO PROTECTIVE STRIPS OF WOODLAND, TO FIND WHAT SPECIES ARE HARMLESS AS RESERVOIRS OF AGRICULTURAL PESTS. Summary of Research Work of Inst. of Plant Protection, Leningrad, for 1935. p. 211-215. 1936. TRANS. 156.

Stroganov, S. U. THE MAMMAL FAUNA OF THE VALDAI HILLS. Zool. Zh. 15: 520-559, maps. 1936. TRANS. 145.

Sviridenko, P. A. STUDY OF THE LAWS GOVERNING MASS INCREASES OF MOUSE-LIKE RODENTS. Summary of Research Work of Inst. of Plant Protection, Leningrad, for 1935. p. 74. 1936. TRANS. 159.

Zenkevich, L., and YA. Birshtein. ON THE ESTABLISHMENT OF NEW SPECIES OF ANIMALS IN THE CASPIAN AND ARAL SEAS. Zool. Zh. 16(3): 443-447. 1937. TRANS. 147.

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